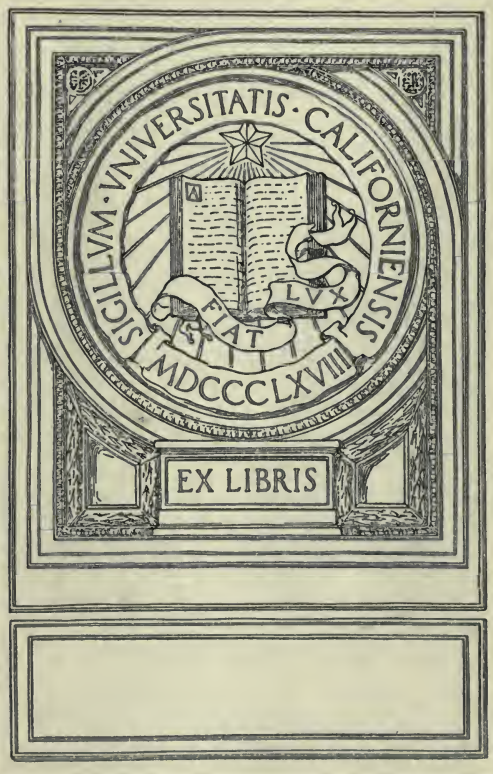
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SCIENCE AND THE CRIMINAL

UNIFORM WITH THIS BOOK

HYPNOTISM AND SUGGESTION

By

BERNARD HOLLANDER, M.D.

"It is the work of a man of established reputation, who has devoted himself for years to the subject, and whose aim it is to tell what Hypnotism really is, what it can do, and to what conclusions it seems to point."—*Globe.*

SCIENCE AND THE CRIMINAL

BY

C. AINSWORTH MITCHELL

BOSTON
LITTLE, BROWN, AND COMPANY
1911

To

Mark Hanbury Beaufoy, Esq., J.P.

as

A Mark of Regard and Esteem

TRIAL OF CAROLINE RUDD

Frontispiece

PREFACE

In the following pages I have endeavoured to give some account of the ways in which scientific discovery has been utilised in the struggle between society and the criminal.

I have tried to describe the principles upon which different kinds of scientific evidence are based, and at the same time to bring human interest into what would otherwise tend to be dry detail by giving an outline of trials in which such evidence has been given. It is, perhaps, hardly necessary to mention that in many of these illustrative trials the accused persons were proved innocent of the charges brought against them, and that although their cases were tried in the criminal courts the title of the book in no way applies to them.

For the accounts of the older trials I have drawn freely upon Cobbett's *State Trials*, Paris and Fonblanque's *Medical Jurisprudence*, and the first edition of Taylor's *Medical Jurisprudence*, while I must also acknowledge my indebtedness to the *Circumstantial Evidence* of Mr. Justice Wills and the recent excellent lectures on *Forensic Chemistry*, by Mr. Jago.

In the later cases I have mainly relied upon contemporary accounts and upon my own impressions of some of the trials at which I have been present.

My best thanks are due to all those who have given me valuable and ungrudging assistance. In particular I would mention Major Richardson, who has kindly given me a photograph of one of his trained bloodhounds and has allowed me to quote the description of an actual man hunt with bloodhounds, from his book, *War, Police, and Watch Dogs;* and Mademoiselle Arlette Clary (and the *Daily Mirror*) who have supplied me with a photograph of a Paris police dog.

I am further indebted to the late Sir Francis Galton and his publishers, Messrs. Macmillan & Co., who gave me permission to reproduce illustrations from his book on *Finger Prints*; and to Mr. Thorne Baker and the *Daily Mirror* for photographs illustrating the use of telegraphy in transmitting portraits.

The excellent drawings of the hairs of different animals were made by my friend Mr. R. M. Prideaux, and are reproduced here by the kind permission of Messrs. Scott Greenwood & Co.

Finally, I would thank the proprietors of *Knowledge* and the Editor, Mr. Wilfred Mark Webb, for the loan of various blocks and for permitting me to make use of material from several articles of mine on handwriting, which have appeared in that journal.

C. A. M.

White Cottage,
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INTRODUCTION

CONFLICT between the Law-maker and the Law-breaker—Illustrations of Deductive Reasoning in Criminal Cases—Scientific Evidence—Scientific Assistance for the Accused—Instances of Advantages of Conflict of Scientific Evidence—Scientific Partisanship.

IN the constant state of warfare between the law-maker and the law-breaker, which began when mankind first organised itself into communities and has existed ever since, every new invention or practical application of scientific discovery has supplied each side with new weapons frequently of much greater precision.

The advantage thus conferred tends to be on the side of the law-maker but not invariably so; for in spite of all the facilities of investigation now available it is surprising how many crimes remain undetected, or how frequently in suspicious cases it is impossible to discover the truth. The law-breaker's primitive weapon of natural cunning has thus often proved more than a match for all the weapons at the disposal of his opponent.

There is much to be said, therefore, for the suggestion which has recently been put forward on many

sides that a department specially trained for the work of criminal investigation should be created.

Under the present conditions the rank and file of the detective force, recruited as it is from the best of the uniformed policemen, contains many men of acute intellect and reasoning capacity, but it cannot be doubted but that in many cases their efficiency would have been enormously increased by a scientific training.

The present system somewhat recalls that under which doctors acquired their knowledge of medicine in the early part of last century. Their mistakes taught them what not to do, but in the meantime the patient sometimes died.

Methods of scientific reasoning so as to draw deductions from observed facts cannot be acquired by solitary night watches upon a "beat," nor does the facility for breaking up a tangle in traffic which the constable acquires as the outcome of his daily duties, necessarily render him more capable of extricating from a mass of confused details the essential facts upon which stress should be laid.

In some of the unsolved mysteries that have occurred during the last few years the presence of a highly trained intellect at the first hour of the investigation might conceivably have led to the detection of the criminal. As a rule, it is only after the first examination is over and the case appears likely to be a difficult one, that the best brains of the department are brought to bear upon the facts, and it may then be too late for effective action.

It should be made possible for a man who possesses

a facility for this type of work to join the criminal investigation department without having to go through the routine work of a police constable, which will probably add nothing to his powers of following up a clue ; but, on the other hand, this period of probation should be occupied by practical training in scientific methods of working.

The present conditions both of payment and of status are not of the kind that will attract the highest type of brain to the work of criminal investigation, and yet there is no reason why it should not be made to offer the advantages of other branches of professional work.

An apt illustration of the use of acute observation and deduction in solving a mystery is afforded by the strange story of a shooting accident, that, according to a writer in one of the leading morning papers, took place many years ago.

A country gentleman was found lying dead upon a sofa, with the whole of the charge of a sporting gun in his body. The discharged gun was hanging in its usual place upon the wall, and there were no indications of any struggle having taken place. All the circumstances apparently pointed to the man having been murdered in his sleep, for it was impossible for him to have shot himself and have then replaced the gun upon the wall, and strong suspicion fell upon one of the servants in the house.

This man was arrested, and would probably have been convicted had it not been for the detective noticing that the dead man's watch, which had been smashed by some of the shot, had been stopped early

in the afternoon, and that at exactly the same moment the sun was focussed through a bottle of water that was standing upon the table in such a way that the ray fell upon the nipple of the gun upon the wall.

Accordingly he loaded the gun again, hung it in the same spot, and placed a dummy figure upon the sofa, and as soon as the sun's rays passed through this unintended burning-glass and were focussed upon the gun, an explosion occurred and the contents were discharged into the figure.

The writer has been unable to trace the date of this occurrence, but even if it is not founded upon fact it is not impossible, for there are undoubtedly cases where papers have been set on fire by the rays of the sun being concentrated upon them, through a bottle of water.

An instance of the way in which one small fact may give conclusive proof that a crime has been committed is afforded by the trial of Swan and Jefferies in the early part of last century.

The prisoners, who were indoor servants, had committed a murder and then raised an alarm with the object of throwing the suspicion upon burglars, who they alleged had broken into the house. But an examination of the grass outside the house showed that although dew had fallen heavily through the night there were no indications of its having been disturbed by footsteps. This piece of circumstantial evidence led to their arrest, and they were subsequently convicted and executed.

Equally convincing were the clues that led to the arrest of Courvoisier in 1840, for the murder of Lord

William Russell, who was then seventy-five years of age.

The prisoner had only been in the service of the murdered man for a short time. He stated that on the night before the murder he had left his master reading in bed, as was his frequent custom, and a fact in support of this was that the candle had burned down to the socket.

Early in the morning the housemaid found the silver plate scattered about the room, and various articles of value tied up in bundles, as though burglars had broken into the house and had been interrupted in their work.

She called Courvoisier, and he appeared almost immediately, fully dressed, and going into the room of Lord William Russell found him with his throat cut.

On a door were marks which indicated that it had been broken in by the supposed burglars, but closer examination showed that the damage had been done from the inside. In addition to this, any burglars entering the house through this door must have passed over a wall, and this was found to be thickly coated with dust which had not been disturbed.

For a long time no trace of the missing valuables were discovered, but finally after a thorough search of the premises, some of the money was found hidden behind the skirting in the pantry of the accused, while later on the stolen plate was discovered in the keeping of a man with whom Courvoisier had formerly lived.

Mainly on the circumstantial evidence of these facts

the prisoner was convicted; afterwards he made a full confession of the crime.

Clever deductive reasoning was also shown in the following case, in which the author of a shooting outrage that occurred in 1831 at Ayr was discovered in a singular manner. Someone had maliciously fired a gun into a church, and had hoped to escape detection. It was noticed, however, that some of the bullets, after having passed through the windows, had left a mark upon the wall opposite. By drawing a straight line between these marks and the holes in the windows, and extending the line outside the church, the other end was found in a window on the other side of the street. Subsequently other proof was obtained that the gun had been fired from this window.

Numerous cases might also be quoted where the trained observation of a doctor has called attention to some slight point which would otherwise have been overlooked, but which has furnished the clue to the detection of a crime.

In the year 1806 a man named Blight was shot with a pistol at Deptford by someone unknown, and died from the wound. Sir Astley Cooper, who was called in to attend to the victim, carefully noted the relationship of the body to other objects in the room, and from the position of the wound concluded that the shot had been fired by a left-handed person. This inference drew suspicion upon a gentleman named Patch who was the only left-handed person who had been seen with Mr. Blight. He was a close personal friend of the latter, and no one had dreamed of suspecting him of the crime. The results of further inquiries

proved that this man had fired the shot, and after his conviction he confessed that he had been guilty of the murder.

The fact that a weapon is tightly held in the hand of a person who has been shot is strong presumptive evidence that it is a case of suicide, since it is improbable that the hand of a dead man could subsequently be made to grasp a pistol.

There is a remarkable case on record, however, in which the fact that a pistol was found clenched in the hand of a dead man was at first regarded as evidence of a murder. A son of the deceased, who had slept in the same room was accused of having killed him and of then placing the discharged pistol in his hand to give the suggestion of suicide. Experiments were made in which the hand holding the pistol was lifted into the position in which it must have been held if it had been a case of suicide, and in each instance the hand, when allowed to fall, did not retain the pistol. For the defence medical evidence was given that the spasmodic contraction of the muscles after death would account for the pistol being still clenched in the hand, while the inability of the hand to grasp it afterwards did not prove anything. Evidence as to the presence of a motive was given, but the scientific evidence was regarded as decisive and the prisoner was discharged.

The question whether a person who has apparently committed suicide could possibly have made use of the degree of force to which circumstances pointed has frequently arisen.

The most notable instance of the kind was in

reference to the Earl of Essex who was found dead in the Tower in July, 1683, his throat having been cut. A razor was lying by his side with its blade notched, and public opinion was strongly divided as to whether he had committed suicide or had been murdered. The medical men who supported the former view explained the notches upon the razor blade as the result of its having been drawn backwards and forwards across the neck bone, although for a suicide to have done this would have been an impossibility.

Occasions have arisen where a chemical expert has been asked to state whether a gun or pistol found lying near a body has or has not been recently discharged.

Even in the case of firearms that had been loaded with black powder no very definite answer can usually be given to this question. Taylor suggested that the presence of potassium sulphide (formed from the powder) adhering to the barrel would indicate that the gun had recently been fired, whereas after a short time this sulphide would become oxidised, and no longer give the reactions of a sulphide. After a longer time traces of iron oxide formed from the iron of the barrel might be expected.

It would not be safe to lay stress upon conclusions based upon such data as these, and at best they could only afford corroborative evidence.

An amusing instance within the present writer's experience affords another example of the way in which a trifling point being overlooked may be strong presumptive evidence of attempted fraud. A family of the name of, say, Abendessig, effected an insurance

against burglary with a company which may be described as the Safeguard Assurance Co.

It was not long before they were the unhappy victims of a burglary in which Miss Abendessig lost several valuable pieces of jewellery including a watch, a diamond ring, and several brooches.

In proof of her claim she produced receipts from the jeweller from whom she stated she had bought these articles, the total value of which was given at £150.

There were three receipts in all, dated at intervals of two or three months, the first being made out to Miss Abendessig and the last to Mrs. Lab, she having been married in the interval, and the second to her father, Simeon Abendessig. .

The Safeguard Assurance Co. had a suspicion that the jeweller, who had an address but no shop, was in league with the Abendessigs, and that the first and third receipts had been written at the same time.

The present writer was therefore asked to examine these documents to see whether any evidence of the date of writing could be obtained.

They were both written in blue ink upon common billheads, but the fact that the ink and paper were of the same kind was no proof that they were not genuine receipts.

When, however, the receipt stamps were examined under the microscope it was obvious that the right-hand side of one stamp corresponded with the left-hand side of the other stamp. That is to say, the little projections of paper left when two stamps are torn apart across the perforation exactly coincided in every

instance, a long projection on one being matched by a short projection on the other, and so on.

The exact coincidence of seventeen points could not have been the result of chance, and the stamps on the two receipts must therefore originally have been attached to one another in the sheet.

The further inference was that the jeweller must either have torn them apart and put one on the earlier receipt and the other on the later one at the same time, or he must have had the second stamp put aside for three months and then affixed it to the later receipt.

A much more obvious slip than this was made some years ago in a bogus claim upon a fire insurance company, the story of which is related in Lord Brampton's "Reminiscences." The fire broke out on the premises of a firm of tailors, and it was claimed by them that the whole of their stock, including many hundred pairs of trousers, had been destroyed.

The insurance company, after examining the burnt-out building, instructed a number of their agents to sift carefully the whole of the ashes.

At the hearing of the case the counsel for the company remarked that it was strange that in a fire in which so many pairs of trousers had been burned the metal buttons upon them should not have been found.

On the next day the tailors appeared with a whole bucketful of buttons, but their production was too late to be convincing, for the ashes had been thoroughly sifted before the claimants attempted to make good their oversight, and only a very few trouser buttons had been discovered.

On the other hand, the danger of jumping to a

sudden conclusion from circumstances has been frequently demonstrated. Thus, a very extraordinary case in which some facts that clearly pointed to the guilt of a prisoner were found to have misled many witnesses, was tried in 1813 at the assizes at Bury St. Edmunds. A farmer who owned upwards of 1,200 acres was accused of burglary, and as evidence against him it was positively stated that certain articles in his possession had been stolen from the house. The witnesses swore that they had identified some sheets by stains upon them and a cask by the fact of its being marked with the letters P.C. 84 in a circle. For the defence, witnesses stated that the prisoner was in possession of sheets stained in exactly the same way, and that the cask was one of those in which he had received cranberries from Norwich, all of which casks were marked in the same manner. The prisoner was acquitted.

Scientific testimony is another form of the so-called "circumstantial evidence," and as such is sometimes looked upon with suspicion. Yet in how few cases is it possible to produce the man who can say, "I saw the deed done," and even in such cases, what errors of identification may occur! In far the greater number of crimes the proof must depend to a large extent upon the evidence of circumstances. But these must be so convincing that it is impossible in reason to draw any other conclusion from them. In this country it is the duty of the prosecution to prove the guilt, and unless that is done in such a way as to leave no shadow of doubt in the minds of the jury, a prisoner is entitled to be acquitted.

There must be no speculation upon a man's guilt. A man is regarded as innocent so long as it is impossible to connect to him the last link in a long chain of circumstantial evidence.

In the brief accounts of various celebrated trials in the following pages an attempt has been made to give an outline of the scientific circumstantial evidence that has led to the conviction or acquittal of the prisoners. In some of these trials proof of guilt has been overwhelming, although the testimony of an eye-witness has been lacking, but in others the Scotch verdict of "Not proven" (a curious equivalent of which, however, was once given in the trial of Mrs. Rudd) would be a more fitting deduction from the evidence, than the alternative of "Guilty" or "Not guilty," which is all that is allowed by the English law.

A good illustration of the value of scientific proof was seen, in 1884, at the trial of a woman named Gibbons on the charge of having shot her husband.

For the defence it was urged that the man had committed suicide. There were four bullet wounds from a revolver in the body, and the medical evidence went to prove that although any one of the wounds might have been inflicted by the man himself, it was extremely improbable that all of them had been. Moreover, some of them were in such a position that they could only have been self-inflicted if the revolver had been held in the left hand, whereas witnesses testified that the deceased was not left-handed. The prisoner was found guilty.

Attempts have frequently been made by defending

counsel to obtain permission for a scientific man to be present on behalf of a prisoner at any examination made before a trial, but all such requests are invariably refused.

It is quite a common occurrence, however, for the evidence given by scientific witnesses for the prosecution to be controverted by scientific witnesses for the defence, and the most recent instance of the kind at the trial of Crippen will be fresh in the memory of everyone. Where there is any possibility of doubt it should be possible for every prisoner to obtain scientific assistance.

An accused person who lacks the means to procure legal assistance in his defence has assigned to him by the Court a barrister who will represent his interests and see that they do not suffer from ignorance of legal technicalities.

This principle might well be extended so as to cover the ground of scientific evidence. Under the present conditions the prosecution has unlimited facilities for applying every description of test, but it has not always been easy for the representatives of the accused person to obtain scientific help in criticising the nature of this evidence.

Scientific evidence should be, and usually is, quite impartial, but the everyday conflict of honest opinion in civil actions illustrates the possibility of mistakes occurring or of certain points that would tell in favour of the accused being overlooked.

For instance, suppose a stain on the clothes of a person accused of murder were examined by a chemist for the prosecution and found to consist of blood.

The fact would tell against the accused, even though the witness (as in a recent case) could express no opinion whether it was human blood, or the blood of an animal. Assuming in this hypothetical trial that the blood stain was really due to rabbit's blood, another chemist representing the prisoner might be acquainted with the comparatively recent physiological methods of distinguishing between the blood of different animals, and thus be able to prove the real nature of the blood stain and break one of the links in the chain of evidence.

In most of the important criminal trials the scientific evidence is given by more than one witness, and the possibility of mistake is thus greatly reduced, but this is not invariably the rule.

Scientific criticism derived from a first-hand examination of the material would be of much more value than the criticism of the statement of the results, and might have considerable weight upon the conclusions of the jury.

A defending counsel cross-examining a scientific witness is usually dealing with an unfamiliar subject, and lacks the specialised knowledge that would enable him to point out the weak points in the evidence.

When a wealthy person is on trial, however, the counsel has the advantage of getting the best expert advice upon the scientific matters put forward in evidence, and is thus able to lay stress on all that will help his client, but a poor prisoner lacks this advantage, and therefore runs a greater chance of being convicted.

An early trial in which the prisoner owed his acquittal to a conflict of scientific evidence was that

of Spencer Cowper, the grandfather of Cowper, the poet, who was tried at the Hertford Assizes in 1699 for the murder of a young gentlewoman named Sarah Stout.

With Cowper were also tried several of his friends, whose remarks having been overheard had suggested that they were aware of what had happened to the girl.

Cowper, who was a barrister, defended himself and incidentally his companions. The story told by the prosecution was that at the previous Assizes the prisoner had stayed for a night at the house of Mrs. Stout, the mother of Sarah Stout. The servant-maid stated that she had been told to prepare Mr. Cowper's bed, and that when she came downstairs again, it then being about eleven o'clock in the evening, he had gone out, presumably with Sarah Stout, who was never again seen alive. The next day her dead body was found floating upon the river.

The condition of the body was, it was asserted, conclusive proof that she had been strangled and then thrown into the water; for, to quote the words of the counsel for the prosecution, "when her body came to be viewed it was very much wondered at; for in the first place it is contrary to nature that any persons that drown themselves should float upon the water. We have sufficient evidence that it is a thing that never was; if persons come alive into the water, then they sink; if dead, then they swim. At first it was thought that such an accident might happen though they could not imagine any cause for this woman to do so, who had so great prosperity, had so good an

estate, and had no occasion to do an action upon herself so wicked and so barbarous. Upon view of the body, it did appear there had been violence used to the woman ; there was a crease round her neck, she was bruised about her ear ; so that it did seem as if she had been strangled either by hands or a rope."

The evidence brought forward to support the theory that Sarah Stout had been killed, before being thrown into the water, included that of several local doctors who had examined the body, and also that of several London doctors who were called in as expert witnesses.

These all gave as their opinion that the body of a person who had been drowned must contain water in the thorax, and that since no water was present in the body, death must have been caused in some other way. Two seamen of the Royal Navy were also put into the box, and both were emphatic in their opinion that the body of a person who had been drowned would sink, while a dead body thrown into the water would float.

Spencer Cowper, who, as has been stated, conducted his own defence, cross-examined the medical witnesses and made them admit that they had no knowledge of the way in which the body of a person who had drowned himself would behave.

He entered a strong protest against the body having been examined after the coroner's inquest (at which a verdict of suicide while of unsound mind had been found) by medical men acting in the interests of the relations of the dead woman, with the intention of becoming prosecutors. "If," said he, "they intended to have prosecuted me or any other gentleman upon

this evidence, they ought to have given us notice, that we might have had some surgeons among them to superintend their proceeding. My Lord, with submission, this ought not to be given in evidence." The judge overruled this objection, saying that supposing an ill thing had been done in taking up the body without some order, that was no reason why the evidence should not be heard.

In further cross-examination Mr. Cowper succeeded in throwing doubt upon the statements of witnesses, who alleged that they had seen marks of strangling, and produced witnesses to prove that any marks upon the body had been the result of contact with stakes in the bed of the river. Then he brought forward his own expert medical evidence, which was given by ten of the leading doctors of the day, including Sir Hans Sloane and the celebrated surgeon William Cowper. These held a different view from that of the doctors called for the prosecution, and gave their reasons for concluding that the appearance of the body was quite consistent with death by drowning.

Some described experiments they had made upon animals, which proved that when killed and thrown into the water the body sank at first and then rose to the surface, and also that drowning could take place without much water being swallowed.

As proof of the dead woman having been of a melancholy disposition and not of sound mind, letters of hers were read to the jury, but these her mother and brother would not admit were in her handwriting, since, they asserted, it did not suit her character. (See p. 85.)

The judge, Sir Henry Hatsell, in summing up confessed that he was very much puzzled, and that he perceived that "doctors do differ in their notions about these things."

The conclusion of his remarks is worthy of quotation: "I am sensible I have omitted many things; but I am a little faint, and cannot remember any more of the evidence."

It is not surprising that, soon after Queen Anne came to the throne, he was removed from the bench.

The jury believed the medical witnesses for the defence, and after a short discussion found Spencer Cowper and the other prisoners "Not guilty."

To come to more modern times, the advantage of a conflict of scientific opinion to the accused was seen in the celebrated Maybrick poisoning case. At the trial evidence was given by Professor Tidy to the effect that the symptoms and appearances were not those of arsenical poisoning and that the amounts of arsenic found in the body were not greater than those present in cases where arsenical medicines had been taken months before death, and where there was no suspicion of poisoning. Although the prisoner was convicted and sentenced to death, there can be little doubt but that this evidence had an important influence in determining the subsequent alteration of the sentence to penal servitude.

There is no necessity for such scientific assistance given to the defence to degenerate into partisanship, such as was shown at the trial of Palmer for poisoning in 1856. That case was characterised by many remarkable features, the suspected person, for instance,

being allowed access to the bottle in which had been placed the material taken from the body for analysis, and also being given the opportunity of attempting to destroy it.

Prior to the trial, Taylor, the chemist who was to give evidence as to the presence of poison in the body, communicated with the papers, while Herapath, one of the witnesses called for the defence, publicly accused Taylor of incompetence.

So acrid were the statements of the scientific witnesses for the defence at the trial that the judge commented in vigorous terms upon their evidence as having been given with the object of obtaining an acquittal at all costs. " It is indispensable," he said, " to the administration of justice that a witness should not be turned into an advocate, nor an advocate into a witness."

In another poisoning trial which took place three years later, the chemical evidence brought forward by the defence resulted in the prisoner being set free, after having been sentenced to death. In this case a doctor named Smethurst was accused of poisoning a young woman named Isabella Banks.

Dr. Taylor, who was the chief chemical witness called for the prosecution, had found arsenic in material from the body, although he could not detect any remaining in the tissues. On the other hand, Dr. B. W. Richardson, who was called as a witness for the defence, stated that arsenic was a cumulative poison, and that if it had been given for a long period, as alleged, traces must inevitably have been present. Hence in his opinion the absence of arsenic in the

tissues was conclusive proof that death was not the result of slow arsenical poisoning.

The medical evidence called by the defence, also left room for some doubt as to whether death might not have been the result of dysentery, the symptoms and appearance, it was alleged, being as consistent with that cause as with arsenical poisoning.

The scientific witnesses for the defence did not succeed in convincing the jury, but after sentence of death had been passed the judge forwarded the papers to the Home Secretary, and advised that the opinion of an independent scientific authority should be taken. Accordingly the whole of the chemical and medical evidence was studied by Sir B. Brodie, whose report was that there were six reasons which led to the conclusion that Smethurst was guilty, and eight reasons which pointed in the opposite direction; and that, therefore, the impression left upon his mind, was that the proof of Smethurst's guilt was not absolutely convincing.

The Home Secretary, on receiving this statement of opinion from his scientific referee, immediately granted a free pardon. In this case, but for the conflict of scientific opinion upon the medical and chemical evidence the prisoner would have been hanged.

Instances such as these might be largely multiplied, but the above are sufficient to show that a scientific defence may succeed in breaking down the scientific evidence brought by the prosecution in criminal cases; or, failing that, may (as in the Maybrick case) help to bring about a commutation of the sentence.

There is thus abundant justification for the plea that the poor prisoner should have the same advantages as regards scientific assistance as he now possesses in legal matters, and thus be placed on an equality with a wealthy prisoner.

It ought not to be a difficult matter to draw up a list of men of recognised standing in chemistry and medicine, who would be willing to serve in this capacity when selected by the judge in a trial.

CHAPTER II

DETECTION AND CAPTURE OF THE CRIMINAL

CONTRASTS between Eighteenth, Nineteenth and Twentieth Centuries—Margaret Catchpole—Tawell—Crippen—Portraits and the Press—Charlesworth Case—Bloodhounds—Police Dogs—Circumstantial Detection.

IN the days of the stage-coach a fugitive had a better chance of escaping than in the present age of steam power on land and sea. For then, slow as were the ways of escape, the ways of advertising the crime were slower still, and once on board a ship a runaway was comparatively safe from arrest.

The story of Margaret Catchpole, which has now become almost classic, may be cited as a good illustration of the way in which the pursuers were handicapped, when the fugitive had had a few hours' start.

It was in 1797 that Margaret Catchpole, a servant-maid at Ipswich, stole a horse from the stable of her master, in order to join her lover, and disguised as a lad rode all the way to London in eight and a half hours, with only a single stop at Marks Tey, in Essex.

A few hours later the horse was missed, and handbills describing it and offering a reward for the capture of the thief were hurriedly printed and sent out of Ipswich by every vehicle that left the town.

Two men were also despatched in pursuit along the London road, but being falsely directed were about to turn off in the direction of Maldon, when they

chanced to meet a man who had seen Margaret riding to London. But for this chance meeting Margaret would probably have escaped capture.

As it was, the pursuers reached London the following day and Margaret was arrested just as she had concluded a sale of the horse with a dealer.

She was tried at the Bury Assizes and sentenced to death, but through the influence of her former master the sentence was commuted to a term of imprisonment.

Three years later her lover, Laud, who was a smuggler, assisted her to escape from Ipswich gaol, and again handbills for her arrest were issued. She was captured on the beach while in the act of embarking in Laud's boat, and Laud himself was killed in the fight. For the second time she was sentenced to death, and was once more reprieved, her sentence now being transportation to Botany Bay. There she married, and died many years later.

The introduction of the railway did not materially change the relative position of pursuer and pursued; for although the fugitive could travel more rapidly than before, and thus when chance favoured him could get to the coast and on board a ship about to sail, he had against him the more speedy notification of the crime in all directions, which was also rendered possible by the railway.

It was not until a means of communication infinitely more rapid than the steam engine had been discovered, that the balance turned decisively against the man endeavouring to elude the grasp of the law.

It is strange to reflect that it was not until it had been employed in the capture of a criminal that it was

recognised in how many directions the electric telegraph might be of service to mankind.

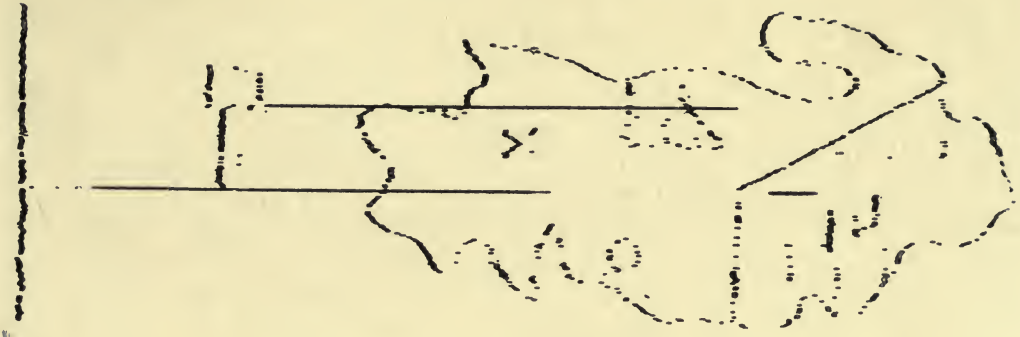
Prior to that time the invention had been little better than a failure from a commercial point of view, for, although the railway companies had some time before this realised the advantages of the new system of communication, the Government had refused to have anything to say to it.

It was thus little short of a revelation to the public when, in 1845, the news was made known that a suspected murderer had been arrested through the agency of the telegraph.

A woman had been brutally murdered not far from Slough, and a neighbour, who had heard her screams, rushed to the spot with a lighted candle in her hand just in time to see a man in Quaker garb hurrying away.

This man, John Tawell by name, a former member of the Society of Friends, succeeded in escaping unchallenged to the station and in catching a train to London, and had it been two years earlier would probably have managed to get out of England; for news still travelled slowly in those times, and the train service to London was very infrequent.

But the police bethought them of the telegraph, which had not long been established on the Great Western Railway, and a description of the wanted man was sent over the wires to London. Although Tawell had had a good start, the message arrived long before him, and detectives were awaiting the arrival of the train at Paddington. He was followed from the station to the Bank, and from there to an



WAR PLAN SENT BY WIRELESS TELEGRAPHY

By kind permission of Mr. Thorne-Baker and "The Daily Mirror"

eating-house, where he had a meal, and finally to a lodging-house in Cannon Street, where he meant to pass the night. Here, much to his amazement, he was quietly arrested. His trial followed in due course, and he was convicted and executed.

There were several points of scientific interest in his trial, which are described on another page.

Last year, sixty-five years after the sensational capture of Tawell, the attention of the whole world was rivetted upon an Atlantic steamer on its way from Antwerp to Canada.

It had on board a man and a woman, who disguised as a Quebec merchant and his son, were expecting to reach Canada without detection. For a week previously search had been made for them in every corner of Europe, and once on board a ship sailing from a foreign port they might reasonably have anticipated that they were safe.

But their portraits had been so widely circulated by the newspapers that their faces were familiar wherever English papers were read, and the ship was only a few miles on its journey when their disguise was penetrated by the captain.

The vessel was fitted with a wireless installation, and now for the first time since its invention wireless telegraphy played the leading part in the capture of fugitives from the land.

The police in London were thus immediately acquainted with the whereabouts of the wanted pair, and an officer was sent off by a swifter steamer to greet them on their reaching Canada. Day by day, with almost feverish excitement, the progress of the *Montrose*

across the ocean was followed, and the chief topic of public interest was the race between the police officer on one steamer and the fugitives upon the other.

The inspector won easily, and was ready waiting to arrest Crippen and his companion at the first approach of the *Montrose* to the Canadian shore.

The trial that followed had many features of scientific interest to which reference is made in another place.

The recent advances in the methods of telegraphing a facsimile of a specimen of handwriting or a sketch, or of reproducing a photograph at a distance have greatly increased the difficulties of criminals escaping detection, and the telectrograph, as it is termed, will prove a powerful weapon in the hands of the detective.

The selenium machines of Professor Korn were employed by the *Daily Mirror* in transmitting the portraits of the chief actors in the Steinheil case, and one of these photographs, which was received in London while the Court was still sitting in Paris, is shown in the accompanying picture.

A still more practical telectrograph is that invented by Mr. Thorne Baker, which weighs only about twenty-four pounds. This has been simplified to such an extent that the photograph may be printed upon a flexible plate with a backing of lead foil, and by attaching this to the transmitting cylinder the thousands of minute points which go to make up the image will be exactly reproduced upon a receiving cylinder at the other end of a telephone wire.

The instrument may also be used with wireless

PHOTO SENT BY TELEGRAPH FROM PARIS

By kind permission of "The Daily Mirror"

installations for the transmission of simple pictures or diagrams, and by its means it would be easy for a ship at sea to send or receive portraits of an individual under suspicion.

The accompanying illustrations, which are reproduced here by the permission of Mr. Thorne Baker and the *Daily Mirror*, show a portrait of King Edward VII and an outline war map which were thus transmitted by "wireless" telegraphy.

Mr. Thorne Baker states that the use of his instrument renders "tapping" impossible, since by merely making a slight alteration in the speed of running the machines, in accordance with a signal arranged beforehand, the pictures would be so distorted as to be unrecognisable.

As an early instance of the use made by the police of a portrait in identifying a suspected individual the case of Arden, who was executed for murder at the beginning of last century, may be mentioned. Arden had given a drawing of himself to a youth, and this was handed to the police who were thus able to identify the accused in London a month later.

The general use of photography in the press has frequently come to the aid of the police, and instances of photographs of a wanted individual being employed for this purpose will occur to everyone. At any police station may now be seen reproductions of photographs of missing individuals, and these being circulated all over the world, reduce to a small compass the limits within which a suspect may go without detection.

Reference may be made to two recent cases by way

of illustration. A nurse had kidnapped a child and all traces of her whereabouts were lost for some days. Her portrait was published in all the leading papers, and being seen by the proprietor of an hotel in the Midlands was recognised as that of one of his guests.

Acting on this information a police inspector suddenly accosted the suspected woman and addressed her in her real name, and she, taken off her guard, answered his remarks naturally, and was at once arrested.

In January of 1908, Miss Violet Charlesworth succeeded in filling pages of every English paper by suddenly vanishing from her creditors, under circumstances intended to suggest that she had been killed. She arranged a motor-car "accident" upon the cliffs at Penmaenbach, and ostensibly was flung through the glass screen of the car into the sea.

As no trace of the body could be found it was soon suspected that there had been no accident, and that before long the victim would come to life again. Her portraits were published in hundreds of papers, and were posted at police stations all over the United Kingdom, and amateur detectives by the score endeavoured to discover her whereabouts.

She was recognised from the portraits in half a dozen parts of the country at the same time, but it was not until a fortnight later that she was positively identified at Oban.

The anti-climax of the farce was reached, when, a few days later, she paid a visit to the London office of her solicitor, and was attended from the station

PORTRAIT SENT BY WIRELESS TELEGRAPHY

By kind permission of Mr. Thorne-Baker and "The Daily Mirror"

by a string of motor-cars each containing the special representative of a London paper.

Two years later she was found guilty of having defrauded a poor landlady of a large sum of money at the time when everyone had accepted her great "expectations" at her own valuation.

There have been frequent failures in the use of bloodhounds to detect a criminal, but this must be attributed, in part at all events, to the circumstance that the dogs have often not been employed until every other means has failed.

In the Luard case, for instance, in 1908, bloodhounds were set upon the track of the supposed assailant of the murdered woman, but the trial was not made immediately after the discovery of the crime. The scent had become faint, and it was therefore not surprising that the dogs, after starting hotly upon the trail, soon lost it again.

The writer is indebted to Major Richardson for the accompanying photograph of his trained bloodhound, "Pathan," and for his kind permission to quote the graphic description of actual man hunts from his fascinating book upon the subject.[1]

"On one occasion, when searching for the body of a woman, I used two collies and a bloodhound. It was summer, and the police, after patrolling the entire countryside, had narrowed the search down to a mountain covered with a dense wood and undergrowth of rhododendron bushes. It happened in midsummer, and the day was very hot. The collies

[1] *War, Police, and Watch Dogs*, by Major E. Richardson (Blackwood and Sons).

worked industriously for almost two hours, keeping well ahead, but after that time they began to flag, and soon refused to leave my heel. The bloodhound, on the contrary, continued persistently to search ahead of me all through the hottest part of the day, until the woman's body was found on the top of the mountain.

" As further illustrating the persistency of the bloodhound when on the trail, I may mention the case of a murder to which I was called in to assist the police in Scotland. As I and my hounds were in England at the time, it was seventeen hours after the murder when we reached the scene. Not only this, but severe frost had intervened during the night, rendering the ground very unfavourable for scenting purposes. The murder had taken place in a town, but evidences were found that the criminal had been at a certain spot outside the town on the cliffs where he had discarded certain belongings.

" I took my hounds to this spot and laid them on the trail, first giving them the scent from the discarded articles. They went clear away for some distance, and leaving the main road crossed some fields through a wood to a cottage. Here they seemed to be at fault, and ran about whimpering. On inquiry at the cottage it appeared that a man had shortly after the murder called there for some water.

" Feeling the hounds were right so far I cast them round about in hopes of their picking up the trail again. After working persistently for a little time one of them, ' Solferino,' opened to a line beyond the wood, and went off at a steady rate followed by the

MAJOR RICHARDSON'S MAN-TRACKER "PATHAN"

By kind permission of Major Richardson

other hound, 'Waterloo,' who also found the line himself. They held to this for a while until checked by a main road.

"The murderer had evidently walked along the road some distance, until, perhaps, scared by a pedestrian or vehicle, and he then evidently took to the fields again.

"Although checked by the road, where the trail became obliterated, the hounds, nothing daunted, kept steadily onwards, casting all the time on each side, until they found it again in the fields. By steadily working in this manner they led us for four miles, partly across country, and partly on the road, to a populous town, and to the vicinity of a railway station. Here the trail was completely obliterated, and it was evident that by this time the murderer had got clear away, probably by train, and was not hiding in the neighbourhood.

"The chief constable testified to the excellent work of the hounds on this occasion, and there is not the slightest doubt, that had this town been supplied with a bloodhound which could have been put on the trail immediately on the discovery of the murder, the murderer would have been quite easily run to earth."

In Moscow a bloodhound is systematically used by the police to discover stolen property, and some of his "finds" have been recorded in all the European papers. In the early part of March of last year this police dog, "Tref," recovered a number of bank-notes and a quantity of silver plate that had been taken from the house of a Moscow gentleman.

"Tref," having been put upon the scent, followed the

trail through several streets until he came to a night-shelter. Here he made for a coat that belonged to a house-painter, and in the pockets of this were found the missing notes. He then left the shelter and followed the trail to the shop of a dealer in old silver, and here the stolen plate was discovered.

In addition to their occasional use as detectives, dogs are now being systematically employed as scouts to accompany the police on their rounds and to aid in the capture of evil-doers.

The Paris dogs, which are specially trained for the police by Mademoiselle Arlette Clary, are cross-bred hounds described as "wolf-shepherd hounds," and "brindled mastiff bulls." They are powerful beasts weighing upwards of twelve stone, and can easily overthrow and master a man.

When attacking, they at once make for the right arm, so as to guard against a pistol bullet, and they are also trained to refuse food except from the hands of those they know, so as to safeguard them against poisoning. As a proof of their efficiency, Mademoiselle Clary informed the writer that one of her police dogs had captured nine apaches in one night.

Last year a demonstration was given in London before the most eminent representatives of the Metropolitan police force, the apache being represented by a man thickly padded to protect him from the teeth of the dogs. When the man attempted to escape over a screen representing a wall the great hound, "Max," promptly caught him and dragged him down again, as is shown in the accompanying photograph which is here reproduced by permission of Mdlle.

FRENCH POLICE DOG

By kind permission of Mdlle. Clary and "The Daily Mirror"

Clary and the *Daily Mirror*. The dog also easily cleared this wall, which was 8 ft. 10 in. high, in one bound, and captured a "padded apache" as he climbed down on the other side.

Police dogs trained on these lines have for some time past been used to assist the police in Glasgow, and within the last few months Nottingham has strengthened its police force by the addition of dogs.

The dogs used in this country are powerful cross-bred animals of the Airedale terrier type, specially reared and trained by Major Richardson. The first dog used for the purpose in this country was given to the Berkshire Constabulary, and its duties are to accompany a policeman on his rounds at Windsor, to protect him from attack, and, if necessary, to capture escaping criminals.

From two to three months are required to train the dogs for this purpose.

In what may be described as circumstantial detection a very faint clue has sometimes resulted in the discovery of a criminal. One of the most striking examples of the kind was seen in 1864, when a gentleman named Briggs was murdered on the North London railway, for the sake of his watch and money.

The murderer succeeded in escaping without having been noticed by anyone, and the crime would probably have made another in the long list of unsolved mysteries, but for several slips that were made by him.

He had changed hats with his victim and his soft felt hat, which was found upon Mr. Briggs, was one of the chief factors in his subsequent identification.

Hats of this particular shape, by the way, were

for many years afterwards popularly known as "Müllers."

The watch and chain of the murdered man were soon traced to the shop of a London jeweller, who stated that he had given another watch and chain in exchange for them. He remembered the man and was able to give a description of his appearance, although he had no knowledge of his name or whereabouts.

At this point all further signs of the trail were lost, for all efforts to discover the jeweller's customer proved fruitless.

Some time afterwards, however, a man called at Scotland Yard with a jeweller's small cardboard box, which, he said, a man who had recently been lodging at his house had given to his little girl. On this box was stamped the jeweller's name, which, ominously enough, was "Death," and this man was the very jeweller to whom Mr. Briggs' watch had been taken.

Thanks to this clue Müller was tracked first to Liverpool and then to New York, where he was arrested and extradited.

At the trial the changed hat found upon the victim helped to prove his identity with the murderer, and he was convicted and hanged at Newgate.

No more extraordinary instance of a single circumstance leading to the detection of a criminal can be offered than in what was known as the "Yarmouth Murder."

On September 23rd, 1900, a woman was found lying dead upon the beach at Yarmouth, and from the

appearance of the body she had evidently been strangled. On her fingers were some rings, but with the exception of the laundry mark upon her clothes, there was no clue by which she could possibly be identified. She had been staying for some days in lodgings in the town, and was known to her landlady as Mrs. Hood. While she was there letters bearing a Woolwich postmark had come addressed to her by that name. Only a day or two before her death she had had her photograph taken upon the beach.

All investigation to discover who the woman really was or to trace her murderer proved unavailing, and at the coroner's inquest a verdict was brought in of wilful murder against some person unknown.

Subsequently it was discovered that the laundry mark upon the dead woman's clothes, 599, was that put by a laundry upon the clothes sent to them from a particular house in Bexley Heath. Further inquiry showed that a woman named Bennett had formerly lived there, and she was identified as the original of the photograph that had been taken at Yarmouth.

This led, early in November, to the arrest of the dead woman's husband, Bennett, who was a workman in Woolwich Arsenal, and he was committed for trial on the charge of murder. He denied all knowledge of the crime, and asserted that he had never been to Yarmouth. This was disproved, however, by collateral evidence, and many facts were brought forward connecting the prisoner with the murder.

The motive alleged for the crime was that Bennett might be free to marry another woman. The date

of the wedding had been fixed, and it was shown that his behaviour after the night of the murder pointed to his having a knowledge of his wife's death. So convincing was the whole of the circumstantial evidence, that after a short deliberation the jury brought in a verdict of "Guilty," and Bennett was executed.

CHAPTER III

PERSONAL IDENTIFICATION

McKeever's Experiment on Fallibility of Eye-witnesses —Gorse Hall Murder—Cases of Mistaken Identity—Gun-flash Recognition—Self-deception—Tichborne Case.

The untrustworthiness of the eye-witness as to detail was recently demonstrated by Professor McKeever at the Kansas State College in the following manner.[1] He asked twenty-five students at the college to witness a short drama, and immediately afterwards to write a detailed description of the characters and incidents.

This little drama, which was supposed to take place in one of the class-rooms, ran as follows :—

Jones, a tall man, wearing a hat and a black mask over his eyes, nose and mouth, and dressed in a grey rain-coat rushed in carrying a salt bag half full of nails in his left hand and a small wrench in his right hand. Across his left cheek was a streak of red paint.

When just inside the door he turned and pointing the wrench at some pursuers, shouted "Stand back, or I'll shoot." He then ran across the room, fell on his knees, and dropped the bag, saying, "There it is, take it"; after which he got up and rushed from the room.

Smith dashed into the room after Jones, crying "Give it up, you scoundrel," and picked up the bag which Jones had dropped. White, short and

[1] *Daily Mirror* report.

stout, dressed in a blue serge coat and cap, and carrying a revolver with its cylinder removed, came in last. He called out to Smith, "Take it from Eddie, he won't hurt you!" He then went out after Jones but before Smith.

The professor pretending to be alarmed jumped up from his chair and exclaimed, "Men, what are you up to here?"

These were the actual facts, and the manner in which the accounts of the twenty-five witnesses disagreed may be shown by a few examples of the different particulars described:—

Jones' appearance: (1) Black coat, light mask. (2) Red mask, cheeks painted red. (3) Black coat, mouth painted red. (4) Carried pistol. (5) Cheeks more than natural redness; club in his hand; dark suit. (6) Dark suit. (7) Black clothes. (8) Red mask on; black clothes. (9) Hatless.

Smith's appearance: (1) Wore a grey suit. (2) Six-footer. (3) Dark grey suit. (4) Bareheaded. (5) Blue suit.

White's appearance: (1) Dark suit and raincoat. (2) Bareheaded. (3) Hardly noticed him (nearly everyone said this).

Smith's conduct: (1) Carried pistol and snapped it several times. (2) Came in last; went out second; said "Get out of here." (3) Carried pistol, snapped it several times, and cried "Stop or I'll shoot," aiming at Jones. (4) Dropped umbrella on floor. (5) Came in last, stayed behind; yelled "Catch that man!"

Professor's conduct: (1) Said: "What's all this?" (2) Said: "What does all this mean?" (3) Said: "Here." (4) Said: "Hullo, what's going on here"? (5) Said: "Who are these men?"

These discrepancies illustrate how difficult it is for the eye and ear to record accurately the impressions received in a rapid succession of events, one of which may focus the attention to such an extent that events simultaneously occurring are only imperfectly or partially observed.

The fallibility of identification by eye-witnesses was strikingly demonstrated at the trial of Benjamin Bates and John Green at the Old Bailey in 1776, on the charge of burglary.

The house of James Penleage had been broken into, and plate to the value of four or five hundred pounds had been stolen.

Mrs. Penleage swore that four men had entered her bedroom, one of whom carried a dark lantern; that two of these men came, one on each side of the bed, and held pistols to her head, and that of these men of whom she had a perfect view, she recognised one as Green and the other as Bates.

Her husband testified as to the house having been entered, and as to his loss, but stated that as he was near-sighted he would not swear to the men, though he believed Bates had presented a pistol to his head.

Evidence was also given by a servant and by another woman, and notwithstanding the good character given to the prisoners by a number of witnesses, the jury brought in a verdict of "Guilty."

The newspapers of the day called attention to the

inconclusive evidence of identification, and as a result the prisoners were respited from month to month.

At last another man, who was executed in the country, confessed that he had also been the author of this burglary at the house of Penleage, and that the two men who had been convicted had had nothing to do with it. In consequence of this Bates and Green received a free pardon, but not until they had been in prison for many months.

A contemporary comment upon this trial richly warrants quotation :—"On this occasion Britons have cause to triumph in the LIBERTY OF THE PRESS. If newspapers had not been printed in this country, the lives of two honest men would have been sacrificed to the rigour of the laws, yet no party concerned have been the least to blame. The ways of Providence are mysterious; casual circumstances frequently produce great effects; and a life may be saved or lost by an accident apparently beneath the notice of a common observer."

Another very curious instance of mistaken identity was that brought out in a trial for robbery in 1784. A barrister had been attacked and robbed in broad daylight, and he positively swore that he had recognised two men named Wood and Brown as his assailants. Fortunately for them the prisoners were able to prove an alibi, which showed beyond all doubt that they were far from the spot at the time, and they were accordingly acquitted. Subsequently the real robbers were discovered and found in possession of the missing property. In this case there was a man of trained

observation, being absolutely certain of the identity of two men, who had never been near the place.

The case of the Perreaus, related in a subsequent page, was another example of the kind. The two brothers, who were twins, were so exactly alike that a money scrivener who had drawn up bonds by order of one or the other of them hesitated to fix upon either. At last, when pressed to make a positive declaration, he fixed upon Daniel as the brother who had come to him in connection with the forged bond.

In 1797 a mistake as to identity resulted in the death of two men. Martin Church, a bookseller, and James Mackley, a printer, were tried that year at the Old Bailey on the charge of murdering Sydney Fryer, at the back of Islington workhouse. Miss Anne Fryer, who was with her cousin at the time he was attacked, swore positively that the two prisoners were the assailants.

Some years later Burton Wood, who was executed at Kennington Common, and Timmins, who was hanged at Reading, confessed separately that they had done the deed for which the other men had suffered.

In modern times the case of Adolph Beck, who was twice wrongfully convicted through his unfortunate resemblance to another man is notorious, and has been the subject of a special report.

The most recent and strangest instances of wrong identification arose out of the mysterious crime which became known as the " Gorse Hall " murder.

In November, 1909, Mr. Storrs, a wealthy mill-owner, who lived at Gorse Hall, in a lonely district in Cheshire, was attacked by a man who had forced

his way into the house. A desperate struggle followed, in the course of which Mr. Storrs was repeatedly stabbed with a knife and fatally wounded. His assailant also attempted to shoot him with a revolver, but this was snatched from him by Mrs. Storrs.

A relation of Mr. Storrs, named Howard, who was an ex-soldier, was arrested and charged with the murder. At the trial that took place at the Chester Assizes in March, 1910, he was positively identified by the widow of the murdered man, who swore that she recognised him by "the look in his eyes." He was also identified by some of the servants at the Hall as the assailant of Mr. Storrs.

Fortunately Howard was able at prove conclusively that he was somewhere else at the time of the murder.

Some time later, another ex-soldier named Mark Wilde was arrested upon the same charge, and once more evidence of identification was given by the same witnesses as in the previous trial, though they were now less positive in their assertions.

The two men, Howard and Wilde, bore a singular resemblance to each other, and evidence was given that at the time of the murder Wilde was dressed in dark clothes, dark cap and muffler, which was the description of the clothes of Mr. Storrs' assailant given by witnesses at the first trial.

Stains upon the prisoner's clothing were identified as human blood by the serum test. The revolver which Mrs. Storrs had snatched from the murderer was also identified as having belonged to Wilde, for it was recognised by two ex-soldiers who had, they

alleged, frequently seen it in his hands, by its broken spring and marks upon its barrel.

For the defence, however, witnesses were called to prove that the revolver taken from the murderer was not identical with that of Wilde, and that the blood upon his clothes was the result of a fight he had had upon the night of the crime.

No motive could be alleged, and the jury distrusting the evidence of identification, found the prisoner "Not guilty."

The murder was thus unique in the fact that two innocent men were in succession identified as the assailant and acquitted.

With regard to the amount of light needed for the recognition of a person, curious scientific evidence has been given in trials, and several cases are on record where witnesses have claimed to identify a person by a momentary flash. A notable instance of this kind was seen at the trial of Joseph Brook for burglary at the York Assizes in 1813.

The prisoner, it was alleged, had broken into the house of a farmer named Strickland at Kirk Heaton.

Anne Armitage, a niece of the farmer, deposed that he had struck upon the stone floor with something she took for a sword to intimidate her, that it produced a flash, and gave a light by which she could see his face. She swore that she had seen enough by the momentary flash to recognise him again. She had also heard his voice, and knew it again when she heard it later, and thought she could undertake to say that it was the voice of the accused man.

The prisoner set up an alibi, and the jury, although

as they stated subsequently, not believing in this alibi, returned a verdict of "Not guilty."

The question of the possibility of a person firing a gun or pistol being identified by the light of the flash was submitted to a committee of scientific men in Paris, in 1809, and their conclusion was that such identification was not possible.

On the other hand, the evidence in a case that was tried shortly afterwards in France indicated that under favourable conditions the face of the person who had fired a gun might be recognised. A man had fired at another at night, and a woman who was near at the time, swore at the trial that the flash had plainly shown her the face of the assailant. Similar evidence was also given by the man who had been wounded.

Experiments to determine this point were made by Desgranges, at Lyons, and from the results of these he concluded that there was a possibility of such identification at a short distance from the flash of the gun, provided that the night was very dark and that there was no other source of light to interfere with the gun-flash; but that if the flash was very pronounced, or much smoke was produced it was not possible to recognise the person firing the gun.

Juries have always been reluctant to convict a prisoner upon evidence of this kind. For instance, at the trial of a man named White at Croydon in 1839, the prisoner was accused of firing at a gentleman while he was driving home in an open trap, and his intended victim, who was shot in the elbow, swore positively that the flash of the gun showed so clearly the features

of his assailant that he was absolutely certain that he was the prisoner. The defendant denied the charge and, notwithstanding the positive statement of the principal witness, was acquitted.

There are other instances, however, where convictions have resulted from such momentary glimpses. Thus, at the trial of some highwaymen in 1799, which is quoted by Paris and Fonblanque (1823), it was stated by a Bow Street officer that he, together with some of his companions, had been fired at by the prisoners upon a dark night, upon Hounslow Heath. He swore that the flash of the pistol enabled him to see that one of the assailants, a man named Haines, who had come up to the side of the coach, was riding upon a dark brown horse which had certain peculiarities about its head and shoulders, and that the rider was wearing a rough brown coat. Afterwards, said the witness, he had seen the same horse in a stable in Long Acre, in London, and had recognised it as the one upon which the man was riding by its curious square head and thick shoulders. The jury believed the evidence of this witness, and the prisoner was convicted.

A case within the experience of a former Recorder of Birmingham (Hill) is mentioned in Wills' *Circumstantial Evidence.* A man was committed for trial at the Assizes at Derby, in 1840, on the charge of shooting at a young woman.

She was prepared to swear that she had recognised him by the momentary flash of the gun.

Experiments were made to determine to what extent reliance could be placed upon such identification,

and the conclusion drawn from these was that "all stories of recognition from the flash of a gun or pistol must be founded on a fallacy."

In addition to these, several instances, collected from different sources, are referred to in Taylor's *Medical Jurisprudence*, where the general conclusion is drawn that occasionally it may be possible to identify an assailant in this way.

From the same source comes the amusing story of a man who swore that he recognised an assailant who attacked him in the dark, by the flash produced by a blow upon his eye! The absurdity of the claim is self-evident, for the "flashes" due to a blow do not emit light, and can therefore never cause any external object to be visible.

A curious factor influencing the value of evidence of personal identification is the readiness with which credulous humanity will accept any story however improbable. But for this the notorious Tichborne case, which dragged on for years, would have been settled in a few days. It is difficult now, recalling the facts, to understand how anyone could have believed in the identity of the butcher, Arthur Orton, with the missing heir to the estates, Roger Tichborne. The latter was of a slim build, while the claimant was a couple of inches taller and weighed twenty-five stones. The real Roger had had the education of a gentleman, while the claimant could neither write nor speak correctly.

Yet, notwithstanding the enormous dissimilarity in appearance and manners of the two men, the mother of Roger Tichborne recognised Orton as the son whom

she and everyone else had believed to have been drowned when the ship was wrecked. When he came to England to see her he had thought it prudent to feign illness. Lady Tichborne, therefore, went to see him, and he got on the bed, and turned his face to the wall. His adopted mother, however, recognised him by his " ears so like his uncle's."

This must have been an instance of self-deception, for there was evidence that the lobes of the ears of the two men were absolutely different.

It was this recognition, however, that encouraged Orton to persevere with his claim to the estates, and assisted in aiding the recollection of other people, who swore that he was Roger.

CHAPTER IV

SYSTEMS OF IDENTIFICATION

PHOTOGRAPHY—Anthropometry—Finger-prints and their Uses.

THE discovery of photography was welcomed by the police authorities of civilised countries as affording a certain means of registering criminals for subsequent identification. But the promise that the photographic method held out was not fulfilled; for with the accumulation of photographs there was a corresponding increase in the difficulties and uncertainties attending the identification of the originals.

Apart from difficulties due to the effects of the changes produced by time or by intentional disguise, it was no light task to search through many thousands of prints to see whether a particular individual had been photographed ten years previously, and physical weariness of the searchers must frequently have set an obstacle in the way of the identification.

On the other hand, it is a matter of common knowledge, that two photographs of the same person, taken under different conditions of lighting or with different lenses may readily be thought to be the portraits of two distinct individuals, or that a photograph of one person may unduly emphasise a momentary expression differing from the normal one, with the result that the portrait may be mistaken for a likeness of someone else. These considerations fully explain the numerous instances of mistaken identification,

some of which are cited below, where the police based their recognition upon old photographs.

Prior to the introduction of the anthropometric and finger-print systems, the insufficiency of the photographic records kept by the police in this country for the identification of criminals was repeatedly proved. The advisability of introducing the French anthropometric system into England was raised in Parliament on several occasions in 1887 and 1888, but each time the Home Secretary defended the system of photographic registration as being sufficiently satisfactory, while he considered it doubtful whether the French system would be any better.

A sufficient answer to this official defence was afforded by the number of cases of mistaken recognition from photographs, that shortly afterwards were brought before both Houses of Parliament.

In 1888, the Lord Chief Justice (Coleridge) mentioned an instance that had come under his notice at the Gloucester Assizes. After a man had been convicted of some small offence police evidence was given that the prisoner was a man who had been convicted before. This was subsequently proved to be a mistake.

Again, in July, 1889, after the conviction of a prisoner, evidence was given by a warder that the man was one who had been sentenced to seven years' penal servitude and seven years' police supervision.

It was found afterwards, however, that this man had been previously convicted in 1882 and therefore could not possibly have been the person alleged. The remarkable feature about this mistake was that both

men had been under the police control at the same time.

The failure to identify a criminal from the photographic records had a tragic result in 1888, when a man named Jackson was given a light sentence as a first offender. Although he had been previously convicted of numerous crimes, and was at the time "wanted" by the police for housebreaking and other offences he escaped recognition, and was able to take advantage of the lenient treatment he received by murdering a warder in the prison at Manchester.

In 1894 a Special Committee was appointed to examine and report upon the different systems of identifying criminals, and they recommended that the anthropometric system was the most satisfactory for preliminary classification, but that for further grouping the finger-print method gave the best results. Accordingly a system including both methods was adopted in this country and was in use until 1901, when, as is mentioned below, the present system of finger-print identification was introduced.

The success of M. Bertillon's system in France speedily led to its adoption in other countries. Early in 1892 it was introduced into India, and within six years upwards of a quarter of a million of classified cards had been collected.

The chief difficulty was found to lie in the classification of the measurements for reference, and a committee was accordingly appointed by the Indian Government to report upon the system. Their report stated that the finger-print method was preferable to the anthropometric system in simplicity, rapidity and certainty.

Since that time (June, 1897) the finger-print method has been in use in India for the identification of criminals.

The system of identification by bodily measurements, which has now come to be known as *bertillonage*, was first introduced as a method of police registration in Paris in 1882. During the first year of its employment it detected forty-nine criminals giving false names, while in the following year the number rose to 241.

In 1889 M. Bertillon stated that there had not been a single case of mistaken identity since the system had been introduced, and that in the previous year 31,849 prisoners had been measured in Paris, 615 of whom were in this way recognised as former convicts, while fourteen were subsequently recognised in prison. Of the latter, ten had never previously been examined, so that the failures were only four in 32,000, or one in 8,000.

The system, as described by M. Bertillon himself in a pamphlet on *The Identification of the Criminal Classes*, consists in taking the measurements of the body structure of each individual. Although such measurements might be indefinitely extended, the number is usually restricted to twelve, including the height, length and width of the head, length of the middle finger, of the foot, etc.

These measurements are rapidly taken with standard instruments by a special staff, and are recorded upon a card upon which are pasted full face and profile photographs of the prisoner.

The data obtained enable the photographs to be classified into different groups of short, medium,

and tall men, and these, again, may be subdivided into groups of short, medium, and long heads, while further subdivisions are afforded by the width of the head, width of the arms outstretched at an angle of the body and so on. The colour of the eyes affords the means for a further subdivision, while special birth-marks or peculiarities differentiate the individuals still further.

In this way alone, M. Bertillon claims that 100,000 persons can be classified into groups of ten each, the portraits in which would offer no difficulty in examination.

M. Bertillon undoubtedly puts the position too favourably here, in assuming division into equal groups; for out of his hypothetical 100,000 individuals, seventy-five per cent. might conceivably be tall men, and seventy-five per cent. of these, again have long heads, so that the final groups would in some cases have no representatives, while in the other groups there might be 1,000 individuals.

In recording the colour of the eyes a special table is used, the scale of which is based upon the intensity of the pigment of the iris. A number corresponding to one of the following groups is then assigned:— (1) Iris, azure blue, with areola pale but free from yellow pigment; (2) Iris blue or slate, with light yellow areola; (3) Same shade, with larger areola approaching orange; (4) Iris, greenish reflection; hazel areola; (5) Same shade with dark hazel areola; (6) Hazel distributed over surface of iris; (7) Eye entirely hazel.

When first the system was introduced into Paris

it was a common practice for the old offenders to change their names and try to escape identification, but, according to M. Bertillon, after a few years this was only done by those who had been away from Paris for a long period, or had some very special reason for attempting to slip through the examination unrecognised.

A similar method is employed in the United States Army for recognising deserters. Each man on joining is measured, and an outline figure card showing the measurements of the front and back surfaces, which are divided into areas by means of dotted lines, is filed in the Medical Department of the War Office. When a man deserts or is dismissed his card is placed in a separate file, and the new cards of recruits are compared with those in this particular file.

A special register, ruled into columns corresponding to the areas on the cards, and giving the measurements and any peculiarities such as scars, tattoo marks, etc., is used to facilitate the search, and when, on reference to this, there appears to be a probability of a recruit being identical with a deserter, the original card is used for the comparison.

During the first five months after the system was instituted (1891) sixty-two men were suspected of concealing their identity, and in sixty-one of these cases the suspicion was justified and the identity acknowledged.

A drawback of the Bertillon system of identification is that much depends upon the accuracy of the person who takes the measurements, and that, therefore, a permissible error must be admitted. In the

United States Army an error of one inch in either direction is allowed, for the recorded height. In addition to this, some degree of natural variation will take place in the course of years, and due allowance must also be made for this influence upon the measurements.

Striking as has been the success of M. Bertillon's system of anthropometrical measurements as a means of identification, it has been altogether surpassed in certainty by the methods of recording the impressions of the fingers. From time to time in the past use has been made of a finger or thumb impression as a seal or to give a personal mark of authenticity to a document. One of the earliest examples extant of the use of the manual seal is to be seen on one of the Assyrian clay tablets in the British Museum.

This is imprinted in cuneiform characters, and contains a notice of the sale of a field, which concludes with the imprint of a finger nail, and the statement that this had been made by the seller of the field as his nail mark.

Similar imprints of nails are to be seen upon Chinese coins, as has been pointed out by Sir Francis Galton, and a tradition has it that they were first put there as a compliment to an early Chinese Empress who had accidentally pressed her finger nail into the wax model of a coin that had been submitted for her approval. The ancient Egyptians caused criminals to seal their confessions with finger nails.

There are also numerous instances in which impressions of finger-tips are found upon documents, but these do not seem to have been put there with any

idea of identification, but rather to have been of the nature of a ceremonial observance comparable with the legal survival of putting a finger upon the seal of a document, and delivering it as " my act and deed."

The first attempt by Europeans to make use of the characteristic ridges of the fingers to record the identity of individuals appears to have been that of Sir William Herschel, who introduced a method officially into Bengal.

His system arose out of the difficulty of checking forgeries by the natives in India, and his having made two of them record their finger impressions upon contracts, so that he might be able to frighten them should they subsequently deny their signatures.

This was in 1858, and the device proved so unexpectedly successful that for several years Sir William Herschel made a study of the use of finger-prints in identification, and finally found them so satisfactory that, in 1877, he gave instructions for their systematic use in the Hooghly.

A description of the advantages that were thereby reaped is given in *Nature* (1880, Vol. XXIII, 23). The frequent attempts previously made by the natives to deny their own signatures were completely frustrated, and documents thus stamped with a finger-print could not afterwards be disputed.

The use of finger-prints was also invaluable as a means of preventing the fraudulent claims of pensions by persons who were not entitled to them.

Then as the system was found to work so well in these cases it was introduced into the prisons, each new-comer being made to sign the register with the

finger. The official visitors had thus the means of satisfying themselves as to the identity of each inmate of the prison.

Although Sir William Herschel tried to obtain permission to extend the use of the finger-print identification still further, his attempts did not meet with success.

About the same time that Sir William Herschel published the account of his system a suggestion was made to register the Chinese in California by a similar process, but nothing was done in the matter.

There have also been occasional applications of the method to prevent forgery, as, for instance, in 1882 in the payment orders signed by Mr. Thomson of the American Geological Survey, upon which; as a safeguard, he made the imprint of his own finger.

It is to Sir William Herschel, however, that the credit is due of having established the first modern systematic process of registration of individuals by means of finger impressions.

According to Dr. Faulds, the Chinese from time immemorial have caused their convicted criminals to make impressions of their finger-tips as a record, but he gives no details of their system of classifying the prints, if such exists.

The curious markings upon which are based these systems of identification are not confined to the human race, but are also shown by monkeys and to a less pronounced extent by other animals.

The pattern upon the surface of the skin upon the palms of the hand and soles of the feet is formed by the arrangement of what is known as the papillary

ridges. It is readily recorded by carefully coating the finger-tips with a fine layer of printing or ordinary ink and pressing them upon paper so as to leave an imprint of the markings upon the finger.

The uses of these ridges is to assist the delicacy of touch, and also to excrete perspiration through the minute pores with which they are covered.

The effect of rough work upon the ridges is to increase their height, and eventually they may become covered up by the horny accretions known as callosities. On the other hand, the ridges upon the palms of people who do very little manual labour are much less apparent, and when the skin is thin are very low. Hence, in the hands of bedridden invalids there is only a slight development of the ridges.

Several circumstances may lead to a temporary obliteration of the ridges, such as, for instance, the constant puncturing of the skin by the head of a needle in sewing, and the imprint of the forefinger of a tailor will therefore often present a very characteristic mottled appearance.

More permanent alterations are produced by cuts or by wounds that have healed and left a white scar. An instance of this is seen in D in the plate (p. 66), which represents a print of the left-hand thumb of the present writer. Running across the ridges, and breaking their continuity is a line which marks the place where twenty years ago the slip of a knife nearly severed a piece from the thumb. The effect of this cut has been to add a fresh feature of identity to those furnished by the original ridges, without interfering with the identification of the latter.

In the case of jagged cuts or of scars formed in the healing of an ulcer the ridges may be so distorted as to be practically indistinguishable in that place, or they may even be entirely obliterated. Old age has also an obliterating effect upon the ridges, so much so that the finger-prints of an old man frequently exhibit transverse white markings, indicating signs of the surface disintegration of the skin.

A most important point in the application of finger-prints to the identification of the individual is the persistence of the main details throughout life, since otherwise much of the value of the method would be lost. The observations made by Sir William Herschel in India showed that after the lapse of twenty years there was so little change in the finger-prints of a large number of persons that they could still readily be identified in this way.

Sir Francis Galton has also proved the persistence of the general peculiarities in the prints for periods of over thirty years. He points out that an exact correspondence as to the minutiæ is not always to be expected, since what appears to be a ridge in one print may be really the result of imperfect printing of an enclosure. Apart from possible imperfections in the method, there is also a possibility of variation due to the effect of age rendering the ridges less continuous.

In one of the examples given by him finger-prints were taken of a child of two and a half in 1877, and again thirteen years later. Between two of the prints there were forty-two points of resemblance and only one point of difference. This was a small forked

ridge which appeared in the print of the baby, but had been filled up in the print from the boy. This instance is mentioned as unique, for in every other case examined by Sir Francis Galton, comparing prints of the boy with the man, and the man with the old man there was perfect correspondence between the selected points. He therefore concludes that " we are justified in inferring that between birth and death there is absolutely no change in, say, 699 out of 700 of the numerous characteristics in the markings of the same person such as can be impressed by them whenever it is desirable to do so."

An interesting series of photographs was recently exhibited by the Chief Commissioner of the Police. These included the portraits of three men who so closely resembled one another that they would readily have been mistaken for one another in photographs. Their finger-prints, however, were quite distinct.

So persistent are these distinctive markings that they last as long as the skin itself, and may be clearly seen upon the fingers of Egyptian mummies.

However much the general dimensions of the pattern of the prints may be changed by the advance of age or the effect of disease, the number of the pattern will still remain. To use the apt illustration of Sir Francis Galton, the changes to be expected are comparable with those seen in a piece of lace. The material may be stretched in one or the other direction or shrunken to half its former dimensions, but the individual loops and knots may be identified with those in the original fabric.

As is the case with all the other measurements

of the human body alterations will occur in the size of the markings; for the pattern as a whole increases with the growth of the finger, but this growth does not affect the arrangement of the loops and ridges that make up the markings upon the skin.

In no other way than a study of the finger-prints is it possible to find over a thousand points of comparison upon which to establish the identity of an individual.

In estimating the value of finger-prints as evidence of identity, Sir Francis Galton found that out of 1,000 thumb-prints the collection could be classified into 100 groups each containing prints with a more or less close resemblance to one another. He further found that on the average it was impossible to put great reliance upon the general resemblance between two given prints as a proof that they were produced by the same finger, though obvious difference was a proof that they were produced by different fingers.

But on studying the minutiæ of the patterns, and calculating the chances that the print of a single finger should agree in all particulars with the print of another finger, he concluded that it was as one is to about sixty-four millions; so that the chance of two persons giving similar prints from a single finger would be less than one in four. If the comparisons were extended to two fingers the improbability of agreement in all details would be squared, "reaching a figure altogether beyond the range of imagination."

The general conclusion drawn from these numerical results was that even after making all allowance for

ambiguities and for possible alterations caused by accident or disease, a complete, or nearly complete, agreement between two prints of one finger and infinitely more so between two or more fingers, afforded evidence, which did not stand in need of corroboration, that the prints were derived from the fingers of one and the same person.

In finger-prints, therefore, we have the only means of proving the identity of an individual beyond all question.

In the prehistoric flint-holes at Brandon, in Suffolk, there was found some years ago a pick made from the horn of an extinct elk. This had been used by some flint-digger of the stone age to hew out of the chalk the rough flints which were subsequently made into scrapers and arrow-heads. Upon the dark handle of this instrument were the finger-prints in chalk of the workman, who, thousands of years ago, flung it down for the last time.

It is strange to reflect that in these perishable impressions he had left a far more permanent record of his identity than he could have done by any other conceivable means.

A striking feature in the scriptural account of the death of Jezebel is that her body was devoured by the dogs, which left nothing but the skull and the palms of her hands and soles of her feet, so that no man might say "this is Jezebel." Yet, as Sir Francis Galton pointed out, it was upon those parts that the dogs had spared that Jezebel carried the only certain proofs of her identity.

The question of heredity in finger-prints is not

only interesting but might also conceivably be a point of some importance in a criminal trial.

Dr. Faulds concluded that heredity played a great part in the particular form of the markings. "The dominancy of heredity in these patterns is sometimes very striking. I have found unique patterns in a parent repeated with marvellous accuracy in his child."

He suggested that there might thus possibly be an Orton type of pattern and a Tichborne type, to one or other of which experts might have referred the finger impressions of the claimant in the celebrated case.

While there is unquestionably a general tendency for a particular type of finger-prints to be inherited just as any other bodily peculiarities are liable to be passed on from the parents to the children, there is by no means that definite relationship that Dr. Faulds hoped to establish.

The observations made by Sir Francis Galton upon this point, and the mathematical considerations based upon them render it impossible to doubt that the average resemblance between the finger-prints of two brothers or of a brother and sister is greater than in those of two persons selected at random.

The general similarities in the finger-prints in rows A and B in the plate (p. 66), which are those of two sisters, are obvious.

The case of twins is particularly interesting, for it is well known that when of the same sex they frequently show remarkable physical and mental resemblances or the reverse. Here, too, it was found by

Sir Francis Galton that the finger-prints exhibited a strong tendency to similarity, although in no case were the resemblances so close that the prints of one twin could be mistaken for those of the other.

For instance, the resemblance may lie in the pattern being made up of loops or whorls in both, but the smaller details, such as the number of the ridges or their minute peculiarities (*e.g.*, dividing and then reuniting to form a small island), will not be shared.

The results of other observations tended to show that the influence of the mother upon the type of finger-print is more pronounced than that of the father.

The existence of racial peculiarities in finger-prints, which Dr. Faulds believed that he had discovered in the case of the Japanese, has not been borne out by the experience of others.

The observations of Sir Francis Galton upon numbers of prints representative of pure English, pure Welsh, Hebrew and Negro proved unquestionably that there was no pattern peculiar to any of these races.

The only suggestion of any difference was that the width of the ridges appeared to be more uniform and their direction more parallel in the finger-prints of negroes than in those of the other races.

The same conclusions were drawn from the observations upon the finger-prints of different classes of individuals, those of art students being compared with those of science students, of field labourers, and of idiots. In each instance it was possible to match the type of patterns in one class with those in any of the others. The patterns of the finger-impression

of a statesman, for instance, could be matched by those of an idiot.

The first attempt to classify the various patterns formed by the ridges was that of Purkenje, a doctor of medicine who, in 1823, delivered a thesis upon the subject at the University of Breslau.

He concluded that all the varieties of curves might be grouped under nine main heads or standard types, which he described as follows :--

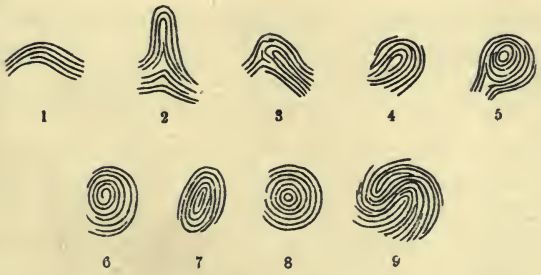
(1) *Transverse curves.* (2) *Central longitudinal stria.* (3) *Oblique stria.* (4) *Oblique sinus.* (5) *Almond.* (6) *Spiral.* (7) *Ellipse or elliptical whorl.* (8) *Circle* or *circular whorl ;* and (9) *Double whorl.*

The differences between these different types are best shown by diagrams, and the accompanying figure, reproduced by permission of Sir Francis Galton, represents the cores of the nine standard patterns.

This classification, resting as it does upon merely superficial appearances, does not afford a certain means of separating the types, since factors, such as the depth of printing, the size of the patterns, and the prominence of secondary details may have an undue influence in the placing of a particular print in one or the other group.

After numerous futile attempts to make use of Purkenje's system, Sir Francis Galton discarded it in favour of a system in which the triangular space or spaces found in the majority of finger impressions was made the basis of classification. Starting upon the two divergent ridges from these spaces an outline was then drawn as far as it could be traced, the course

THE STANDARD PATTERNS OF PURKENJE



CORES OF THE ABOVE PATTERNS

1. Transverse flexures
2. Central longitudinal stria
3. Oblique stria
4. Oblique sinus
5. Almond
6. Spiral
7. Ellipse
8. Circle
9. Double Whorl

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of each ridge being followed with minute fidelity. In this way a series of sharply-defined outline figures were obtained.

The various patterns may, as a rule, be classified into the three main groups of arches, loops and whorls, while some of the transitional forms may be grouped under more than one of these heads. Other patterns, again, which are of rare occurrence, are not suitable for inclusion in any of the three groups.

A system of indexing based upon this method of classification was also devised in which letters represented the varieties of patterns. Thus *a*, *a*, *a* indicate that the outline upon the fore, middle and ring fingers consists of arches, while *a*, *w*, *l* indicate an arch upon the forefinger, a whorl upon the middle finger, and a loop upon the ring finger. The letters *i* and *o* are also used, the former indicating a loop with an inward slope and the latter one with an outer slope upon the forefinger.

The possible variations in such a classification of the impressions of the three fingers of the right hand cannot exceed thirty-six, and a thousand prints may therefore be indexed into one of these thirty-six groups. Subdivisions of these main groups may then be based upon the characteristics of the prints of the fingers of the other hand and of the thumbs, while differences in the cores of the patterns afford a means of forming smaller divisions of the loop patterns.

From observations of the 5,000 prints of 500 individuals Sir Francis Galton found that arches were present in 6·5 per cent.; loops in 67·5 per cent.; and

whorls in 26·0 per cent. Each digit and hand, however, had its own peculiarities, and the variations in the percentage of arches upon different digits ranged from 1 to 17; that of the loops from 53 to 90; and that of the whorls from 13 to 45.

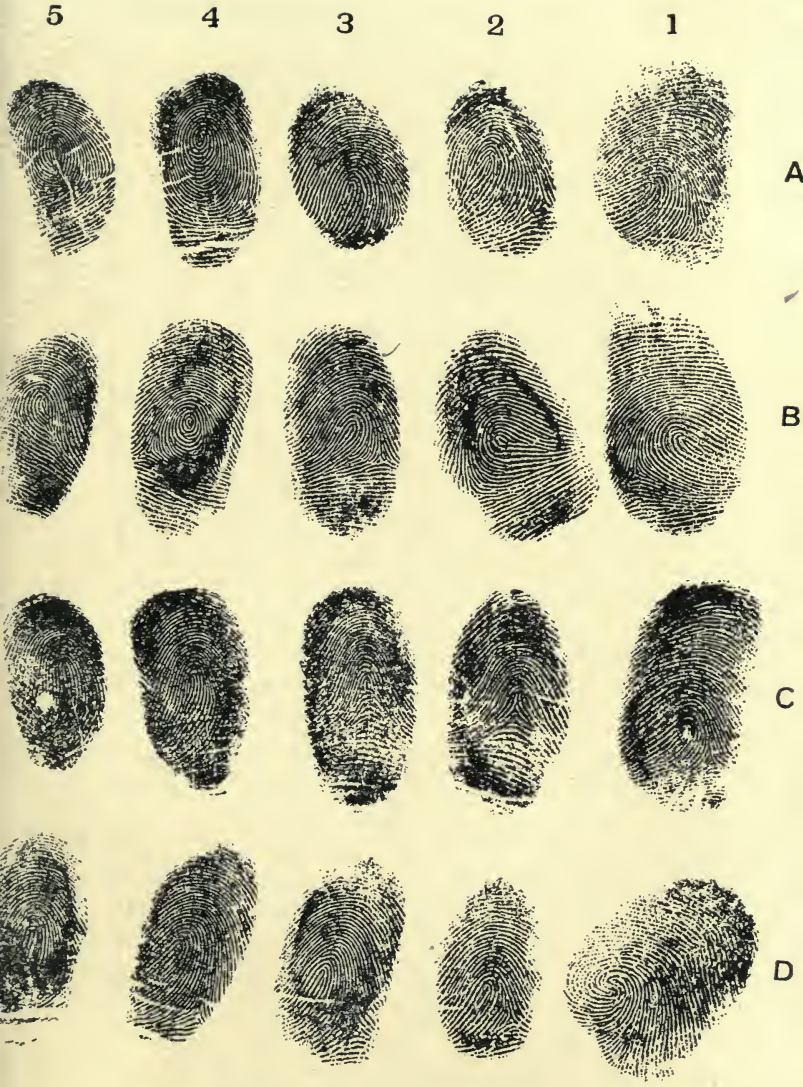
Loops occurred with most frequency upon the little finger and then upon the middle finger, while whorls were rarely met with upon these fingers, but were of common occurrence upon the thumb and ring finger.

The classification employed by the English police was devised by Sir Edward Henry and is a modification of that of Sir Francis Galton, from which it differs in making use of four types instead of three. The impressions are grouped into arches, loops, whorls, and composites. The last group includes patterns made up of combinations of the other three, or those which might be classified either as loops or whorls. There are also numerous subdivisions of the group into patterns with characteristics in common such as "central pockets" and "accidentals," and further differentiation is effected by counting the number of ridges between two fixed points in the patterns.

Examples of these four groups are shown in the plate facing p. 66.

Dr. Faulds, who, while at a hospital in Japan, made an exhaustive study of the finger impressions of the Japanese, appears to have been the first to suggest the possibility of tracing a criminal by the imprints of his fingers upon external objects.

He mentions two instances where the method had



TYPES OF FINGER PRINTS

afforded valuable evidence, and these are worth recording as early examples of the use of the system in detective work.

In one case some rectified spirit had been drunk, and the greasy marks of the fingers upon the bottle plainly showed who was the culprit, for their pattern was identical with that of an imprint in Dr. Fauld's collection.

On another occasion someone had been suspected of breaking into a house, but the sooty imprints of fingers left upon the wall proved beyond all doubt that this was not the person.

The finger-print system of identification was adopted by the police in this country in July, 1901, and the numbers of identifications made since then by the police at Scotland Yard are very remarkable. Up to the end of 1901 there were 93 identifications, which rose in the succeeding years to the following numbers: In 1902, 1,722; in 1903, 3,642; in 1904, 5,155; in 1905, 6,186; in 1906, 6,776; in 1907, 7,701; in 1908, 9,440; and in 1909, 9,960.

There have been some very striking instances of the detection of criminals by means of their finger-prints, a few of which may be quoted by way of illustration.

On March 20, 1908, a man named Chadwick was tried at the Birmingham Assizes on the charge of housebreaking and stealing at Edgbaston. He had left finger-prints upon a champagne bottle, and when these were made clear by the application of powdered blacklead they were found to correspond exactly with the finger-prints of the prisoner. Inspector

Collins, in giving evidence on this point, stated that there were a million and a quarter classified finger-prints at Scotland Yard, and that these could all be distinguished from one another. He pointed out that there were twelve ridges which were characteristic and identical in the two prints.

Similar identifications in cases of burglary have been made by means of the impressions left on a wax candle, on windows, on paper, such as a cheque, or on the metallic surface of a cash-box, etc.

On March 11th of last year, a labourer named George Lane was put on trial at Birmingham on the charge of breaking into the house of a bootmaker and stealing several articles. He had left a thumb-nail mark upon a glove-box, and evidence was given as to the identity of this with his own thumb-print. For the defence it was urged that he was in Nottingham at the time, and that he could call as a witness "a tall dark man working in a bar." The judge offered to postpone the trial for the attendance of this witness, but warned the prisoner that if his statement were found to be untrue he would be prosecuted for perjury in addition to the present charge. The prisoner thereupon said he preferred the trial not to be delayed. He was found guilty, and after evidence of previous convictions had been given he was sentenced to three years' penal servitude.

In April of last year an equally convincing proof was offered of the value of the finger-print system, when it proved the identity of a dead man. The scattered remains of this man were found upon the railway line near Slough, and there was no clue whatever as to his

identity. Upon the off-chance of the victim's finger-prints being known at Scotland Yard impressions from his fingers were taken by the local superintendent of the police and forwarded to headquarters, where on reference to the index of finger-prints they were immediately recognised. They were those of a man twenty-four years of age, who had been living at Deal.

This was noteworthy as being the first occasion upon which the method has been used to discover the identity of anyone after death.

A striking proof of the value of finger-prints in the identification of an individual by the French police was afforded last year in Paris.

A man named Lemarque, one of a notorious gang of thieves, known as Chaffeurs de la Drome, had escaped when three of his companions had been captured. They were tried at the Assize Court of the Drome Department in July, 1909, on the charges of murder and robbery and were condemned to death, while Lemarque was sentenced by default.

All attempts to discover the missing man proved fruitless, until in March, 1910, a man was arrested for theft at Nîmes. He gave the name of Charles Garnier, but the police suspecting that the description he gave of himself was false, took impressions of his finger-prints, and forwarded these, together with the man's description and photograph, to the Anthropometrical Department of the Prefecture of Police in Paris. The finger-prints were immediately recognised by M. Bertillon, and Charles Garnier was identified as Lemarque, the man who had so long been " wanted."

CHAPTER V

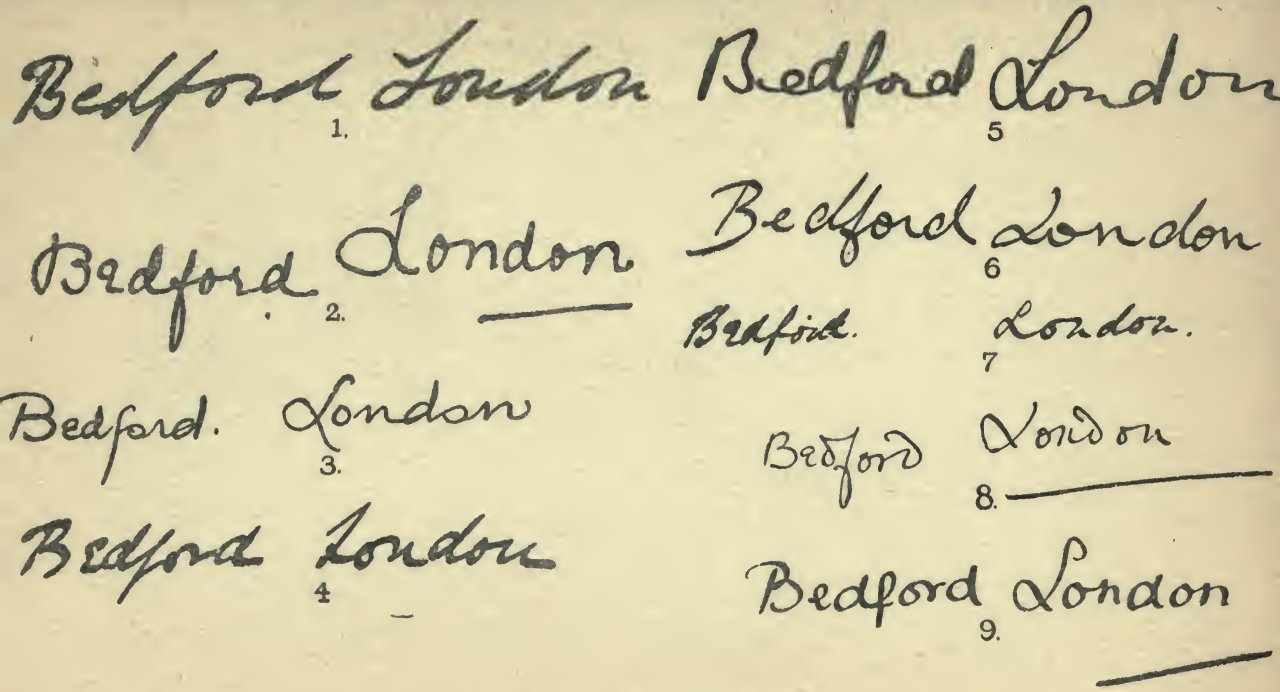
IDENTIFICATION AND HANDWRITING

HEREDITY—Emotional Influences—Effects of Disease on Handwriting.

THE identification of an individual solely by means of his handwriting is always liable to lead to a miscarriage of justice, for even in the cases of the closest resemblance between two writings there can be no certainty on this point. In the following pages I have attempted to point out under what varying conditions handwriting may show alterations and thus lead to wrong conclusions.

In the making of handwriting heredity plays a very important part, just as it does in the characteristic gait and the little mannerisms which are peculiar to each individual. In addition to this, the writing may be modified by the results of training and other external influences.

It is obviously not possible to determine from which ancestors all the features in one's handwriting are inherited, just as it is impossible to trace the origin of certain obviously inherited traits of character. At the same time, instances in which close resemblances may be noticed between the handwriting of a man and that of his father and grandfather will occur to everyone. Thus a particular slope in the direction of the writing or a mode of looping the letters or of forming certain words may be passed on from generation to generation.


Bedford London
1.
Bedford London
2.
Bedford London
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Bedford London
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Bedford London
5
Bedford London
6
Bedford. London.
7
Bedford London
8.
Bedford London
9.

A remarkable fact in this connection is that there is frequently a tendency for a son to inherit certain characteristics in the father's writing and for the daughters' writing to resemble more closely that of their mother than that of their father.

The examples shown in the figure illustrate this tendency. The words were all written by members of one family, the first two lines being those of the father and the mother. The third, fifth, eighth and ninth lines were written by their daughters, and the fourth, sixth and seventh lines by their sons.

It will be noticed among other points of resemblance that the bold characteristic looping of the letter L in the mother's handwriting is reproduced more or less closely in the writing of all the daughters, while the sons form the same letter with a small loop, as in the word written by their father. The angles at which the different words are written also show the effect of this "parallel heredity," as it might be termed.

While possessing such points of resemblance obviously inherited from the parents' handwriting, the writing of each of the children also shows characteristics of its own that distinguish it from the writings of the others—characteristics partly inherited from other ancestors and partly the result of environment.

So close, however, is the resemblance between the handwriting of the father and of the eldest son that on more than one occasion one has been mistaken for the other by other members of the family.

The normal handwriting of every individual is affected by very many external influences, the term "normal" being used here to describe writing that is

done when the thoughts of the writer are being concentrated upon what is being written and without a mental side-glance at the form of the writing itself.

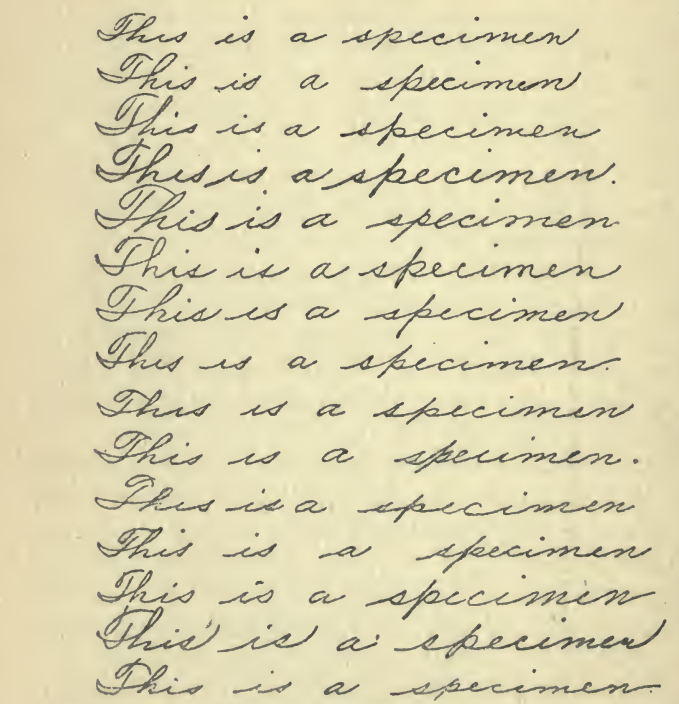
In the latter case various psychological influences cause the writing to vary more or less. For instance, the handwriting of an artist may show marked variations at different periods, especially in the form of the capital letters; for the artist usually keeps before his eye the decorative effect of his letters and words, and is constantly making experimental changes in his writing.

In like manner, handwriting is often influenced to a considerable extent by sub-conscious memories of the writing of other people, especially of those whom the writer tries to imitate in other respects. In some individuals this unintentional imitation of other handwriting is so pronounced that they are unable to answer any letter without its characters having some effect upon their own writing.

Conscious imitation is a still more frequent influence upon the form of writing and some of its effects may become fixed characteristics.

Instances of this are to be seen in the "good" writing of the old-fashioned writing-master, whose ideal was the copper-plate engraving of the visiting card with its thick down-stroke and thin up-stroke and absolute regularity of letter; in the pointed Italian writing, taught generally in mid-Victorian ladies' schools; in the Civil Service "hand" set as a standard for securing marks in examination; and in modern commercial handwriting now rapidly giving place to the typewriter.

An instance which illustrates the manner in which a writing-school will turn out hundreds of pupils all writing in the same manner is shown in the accompanying figure, for which I am indebted to Mr. W. J. Kinsley, of New York. The members of a class in



Influence of training on handwriting
Each of these lines was written by a different person

the Packhard Business School at New York, numbering about forty young men and girls ranging from sixteen to twenty years of age, were all told to write the same

words: "This is a specimen of my writing," without any directions being given them and without knowing for what purpose it was wanted. The results obtained, some of which are here shown, were published in a paper in New York. The striking resemblance among them all is obvious at the first glance, and when these specimens first appeared a lawyer wrote to the editor complaining that an attempt had been made to pass off the handwriting of one person as having been done by several.

The writing of the writing school is no more the real writing of the individual than laborious printing in capitals would be.

Even when what must be regarded as the vicious style of the writing school has been so thoroughly acquired that the writer ceases to be conscious that he is copying a model, the writing not infrequently reverts to a normal state and will then tend to show indications of inherited traits.

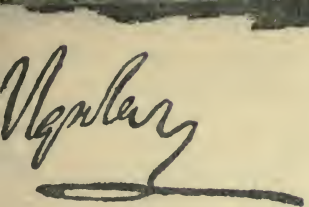
Under ordinary conditions, where there has been no prolonged attention given to the form of the writing, as in conscious imitation or experimental alteration, and but little unconscious imitation, certain distinctive features may persist for a very long period. Thus the angle at which the writing slopes may remain practically the same for years, or the form of a particular slope beneath a signature will repeat itself almost exactly time after time, and even the absence of a flourish may become a significant characteristic.

Emotional influences often have an effect upon handwriting, though the alterations thus produced are frequently only slight and temporary. Thus a

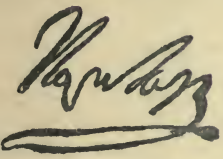
man weighed down by overwhelming grief will often write in smaller characters than usual, while violent anger will find its expression in more vigorous cross strokes to the "t's," heavier dotting of the "i's," and the thickness of a flourish to a signature. On the other hand, slight changes caused by long-continued depression may leave permanent traces upon the handwriting.

A deeply interesting historical instance of this tendency of handwriting to vary with the mood of the writer is to be seen in the signatures of Napoleon at various periods of his career. Several of these written on occasions calling forth widely differing emotions are here reproduced, and it is not difficult to discern in some of them the effect of emotional influence. Very striking, for instance, is the difference between the orderly signature written after the victory at Austerlitz and the blotted scrawl dashed off after the defeat at Leipzig. Nor will it escape notice that nearly all the signatures written at moments of depression or failure have a downward slant, whereas that of the victor of Austerlitz runs upwards. A great contrast, too, is shown between the general features of the first three signatures penned in moments of triumph or success, with that written on the retreat from Russia and the still less assertive signature of the prisoner of St. Helena.

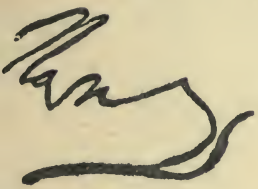
Instances of the effects of passing emotions upon writing might be multiplied indefinitely, but what has been said above is sufficient to show that this factor is of importance in drawing any conclusions as to the identity of an individual from his handwriting.



1805, Dec. 2 Signature on proclamation after the victory at Austerlitz

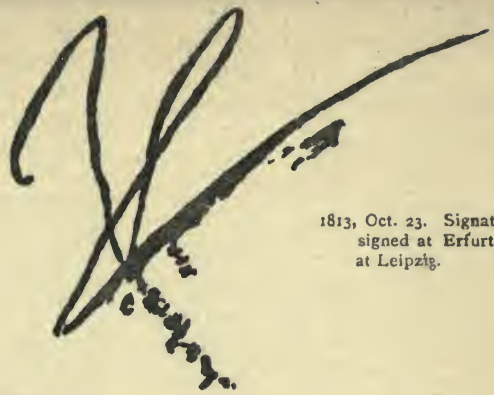


1806 After the campaign of 1806.

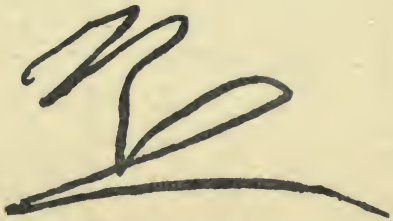


1812, Sept 21 After entrance into burning Moscow

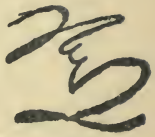
1812, Oct. On the retreat from Russia.



1813, Oct. 23. Signature to a document signed at Erfurt. After the defeat at Leipzig.



1814, April 4. Fontainebleau, prior to abdication.

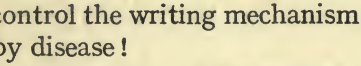


At St. Helena.

SIGNATURES OF NAPOLEON AT DIFFERENT PERIODS OF HIS CAREER

If passing emotions can have so great an influence upon handwriting, how much greater must be the effect when the centre or centres in the brain that control the writing mechanism are affected or destroyed by disease!

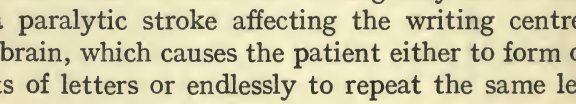
Among the disturbances of handwriting due to defective control of the muscles we may include the



Writers' Cramp

so-called *tremor-writing*, which is common in old age, and the writing of people suffering from writers' cramp, an example of which is shown in the figure.

Other forms of defective writing may be the result of a paralytic stroke affecting the writing centre of the brain, which causes the patient either to form only parts of letters or endlessly to repeat the same letter

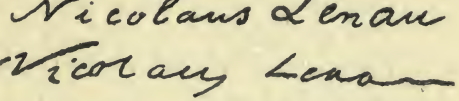


Specimen of Agraphia

under the impression that sentences are being formed, while in extreme cases there may be merely a succession of meaningless strokes in place of written characters.

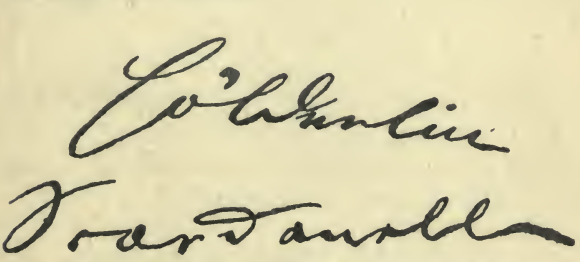
The writing of insane people almost invariably shows the effect of mental disturbance. In some cases

the form of the letters is changed, but they are still used in their right places. An illustration of this is given in the accompanying figure, which represents the signatures of the poet Lenau before and during his insanity.



Writing of Lenau, the poet, before and during insanity

In other instances there is both alteration in the form of the writing and *paragraphia*, or the use of the wrong letters. Thus Hölderlin, the German poet, who became harmlessly insane in 1806 at the age of thirty-six, ever afterwards misspelled his name in the manner here shown.



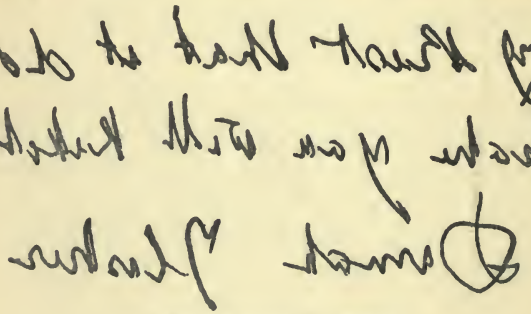
Signature of Hölderlin before and during insanity

A very interesting derangement of writing, which is probably due to the writing centre in one hemisphere of the brain becoming adapted to do the work of that in the other, is that commonly known as *mirror*

writing. An example of this which came under the writer's observation is shown below.

This shows the ordinary handwriting of a working woman of about sixty-six, who for the last three years has been paralysed in the right arm, and since then has produced mirror writing with her left hand.

The most remarkable instance of mirror writing on record is to be seen in the last manuscript of Leonardo da Vinci, known as the *Codex Atlanticus*, in



Mirror writing in paralysis

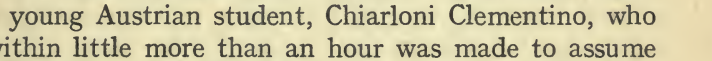
the library at Milan. Various speculations have been made as to why backward writing should have been employed here, but the obvious explanation may be deduced from the letter of a monk, Antonio de Beatis, who, after visiting Leonardo in his retirement at Amboise, wrote that the artist would never paint again, as his right arm was paralysed. The manuscript was in all probability, therefore, written with the left hand, and, as frequently happens in such cases of paralysis, the other hypothetical writing centre was brought into action and mirror writing was produced.

Of all the temporary influences tending to modify handwriting none is more remarkable, or affords a better proof of the way in which written characters vary with the condition of the mind than the effect of hypnotic suggestion.

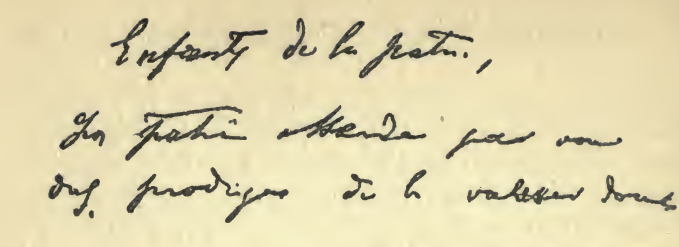
The experiments of Professors Lombroso and Richet have proved that a suggested change of personality is accompanied by an appropriate style in the handwriting of the subject. Thus, a young hysterical girl when hypnotised under the suggestion that she was a child wrote in childish characters.

Still more striking were their experiments upon a young Austrian student, Chiarloni Clementino, who within little more than an hour was made to assume successively the characters of a child, of Napoleon, of Garibaldi, of a clerk, and of an old man of ninety. He was made to write some words on each of his assumed characters, and the writings not only differed to a marked extent from his normal handwriting, but also had characteristics suggestive of the type of individual he was temporarily personating.

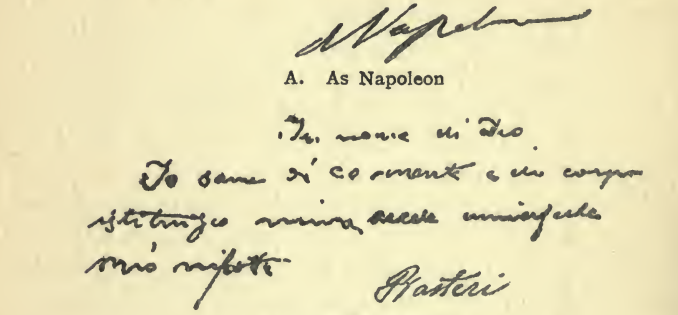
The results of some of these experiments, which the present writer had the permission of the late Professor Lombroso to reproduce, are shown in the accompanying figures. The normal writing of the student is represented below, while Fig. A (p. 82) shows



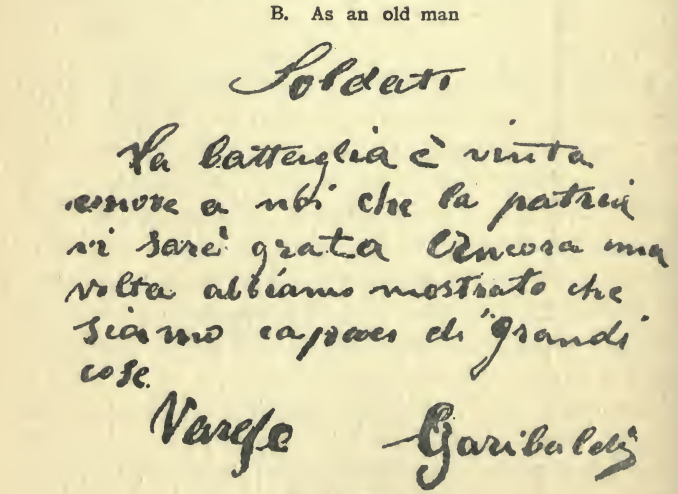
words written under the suggestion that he was Napoleon, Fig. B, his writing as the old man of ninety, and Fig. C that done as Garibaldi.



A. As Napoleon

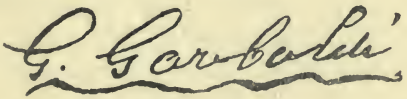


B. As an old man



C. As Garibaldi.

The handwritings of the suggested Napoleon and Garibaldi were quite different from the writing of the real individuals, although it is interesting to note that there is some attempt to form the letters of Garibaldi's signature in the same manner as in the genuine signature here shown.



In a private letter to the present writer Lombroso mentioned that it was quite possible for the hypnotised student to have been familiar with the signature of Garibaldi. Or, again, the hypnotisers may have had their thoughts upon the form of the genuine signature while the student was writing the suggested version of it.

It has been observed by Dr. Preyer that certain individuals, when under hypnotic influence, write in a better handwriting than when they are in their normal condition, whereas in the case of other subjects the letters are childish and badly formed. It is even possible to make them omit by suggestion particular letters from each word they write, " Europe," for instance, becoming " Urop," and so on, while by further suggestion they may be induced to make use again of the missing letters.

The fact that handwriting may be completely altered under the influence of hypnotism is not only of great scientific interest, but may also have an important bearing on the results of legal cases in which handwriting is concerned.

It was pointed out some years ago by Dr. Bianchi that hysterical women are particularly prone to write anonymous letters, and it is well known that such women are readily responsive to hypnotic suggestion.

Facts such as these suggest how necessary it may often be to take into account the possibility of hypnotic influence before deciding upon the authorship of a given piece of writing.

The extent to which a man should be held responsible for what has been written as the result of hypnotic suggestion from another person will obviously depend upon whether he was the dupe or the willing instrument of the hypnotiser. In any case it may not be easy to prove that the writing is his, for it will probably be very different from his ordinary handwriting.

Hitherto no case of criminal libel involving such delicate questions as these appears to have come before the courts, but it is one that might conceivably occur at any time, and a jury would then have to decide upon the responsibility of the writer.

CHAPTER VI

EVIDENCE AS TO HANDWRITING

ILLUSTRATIVE Cases—Handwriting Experts

AT one time the only evidence that was allowed to be given as to handwriting was that of the writer himself, or of someone who had seen the writing done, or was well acquainted with the handwriting in question.

Examples of evidence of this kind are numerous and occur in many of the cases mentioned in other parts of this book, such as the trial of Spencer Cowper in 1699, or of that of the Perreaus in 1775.

In the trial of Spencer Cowper (1699) an important part of the defence was that the girl had drowned herself in a fit of depression, and letters written by her were put forward to prove this view.

A gentleman named Marshall produced letters that he had received from her, and a man named Beale gave evidence that he believed it to be in her handwriting, having seen her write and holding a receipt of hers.

The jury declared they were satisfied with the evidence, but the judge (Baron Hatsell) remarked that they might ask the mother to say whether it was her daughter's handwriting.

Sarah Stout's brother was also questioned.

Mrs. Stout.—How should I know ! I know she was no such person ; her hand may be counterfeited.

The Judge.—But if it were written in her more sober style, what would you say then ?

Mrs. Stout.—I shan't say it to be her hand unless I saw her write it.

Mr. Stout.—It is like my sister's hand.

The Judge.—Do you believe it to be her hand?

Mr. Stout.—No, I don't believe it; because it don't suit her character.

The judge in his summing up remarked that if the jury believed that the letters were in the handwriting of Sarah Stout there was evidence to show that although she was a virtuous woman a distemper might have turned her brains, and discomposed her mind.

The history of the admission of expert evidence on handwriting in this country is a curious one, and shows that opinion has long been divided as to its value.

In a trial that took place in 1836 a bank inspector was put in the box to give an opinion as to the genuineness of a signature and the judge refused to admit this as evidence. The point was carried to the Court of Appeal, but was still left unsettled, an equal number of judges being for and against the admissibility of such evidence.

Mr. Justice Wills, in his standard work on *Circumstantial Evidence*, relates that Lord Denman pronounced that evidence as to handwriting might be regarded as an expunged chapter in the book of evidence. In spite of this dictum, however, the evidence of the handwriting expert was made legal in Civil Cases in 1854, and eleven years later it was also legalised in Criminal law.

Long before a witness was permitted in this country to give his opinion upon writing which he had not

actually seen written, or with the author of which he was unacquainted, expert evidence of this kind was admitted in the laws of different countries in Europe and in many of the American States.

Handwriting Experts.

A good deal has been heard of late of the shortcomings of the handwriting expert, and owing to a mistaken idea as to the nature of his evidence, the view has been strongly expressed that such evidence should no longer be admissible.

The present feeling against evidence on handwriting is partly due to an exaggerated importance having frequently been attached to the conclusions of the expert, so that as soon as it could be shown that he had made a mistake, no further trust was to be placed in his opinion; and partly to the dogmatic attitude of certain experts in the past.

As Lord Brampton pointed out in his *Reminiscences*, the judges in mid-Victorian days were afraid to trust their own judgment in matters of handwriting, and powers almost occult were ascribed to the expert, who, after all, only uses ordinary scientific methods.

The true function of the handwriting expert is to act as a sign-post to the jury. His observation has been trained to notice minute points of resemblance and difference, and he is thus in a position to point out in what respect and to what extent two handwritings resemble one another or differ, and it is then for the jury to draw their own conclusions from the facts laid before them.

It is now no uncommon occurrence for a judge in summing up a case to the jury to emphasise the point that the evidence of the expert is only a matter of opinion, and that the real decision rests with them. In this way it is possible for the judge to correct the too decided statement of opinion which the expert is sometimes, under stress of cross-examination, forced to give.

Netherclift, who was the chief expert in the days when Lord Brampton was at the bar, had such faith in his methods that finally he came to believe that he could never make a mistake.

This belief received an amusing check in a case in which he was under cross-examination by Lord Brampton (then Mr. Hawkins).

Netherclift had claimed that his system gave infallible results, and had further stated that his son, whom he had trained, made use of the same system.

"Then," said the wily advocate, "your son working on your system is as good as you are ? "

" Yes," replied the father with some pride in his voice, " he is."

" That is to say, he, too, is infallible ? "

" Yes," again replied the witness.

" Well, now, Mr. Netherclift, was there ever a case in which you and your son appeared on opposite sides ? "

Netherclift tried to evade the question, which, he complained, was an unfair one, but on being pressed was forced to admit that on a certain occasion he had given evidence on one side and his son upon the other.

Swift came the unanswerable retort, "How comes it then that two infallibles appeared on opposite sides?"

Netherclift's dogmatic manner rendered him peculiarly liable to fall into traps like this, and many were the occasions on which he was found tripping.

Readers of Lord Brampton's book will recall another amusing instance in which the expert was "put in a hole" by his opponent, who tells the story in these words: "When I rose to examine I handed to the expert six slips of paper, each of which was written in a different kind of handwriting.

"Netherclift took out his large pair of spectacles, magnifiers, which he always carried. Then he began to polish them with a great deal of care, saying as he performed that operation, 'I see, Mr. Hawkins, what you are going to try to do—you want to put me in a hole.' 'I do, Mr. Netherclift, and if you are ready for the hole, tell me—were those six pieces of paper written by one hand about the same time?'

"He examined them carefully, and after a considerable time, answered: 'No; they were written at different times, and by different hands.'

"'By different persons, do you say?'"

"'Yes, certainly.'"

"'Now, Mr. Netherclift, you are in the hole! I wrote them myself this morning at this desk.'"

The feeling of distrust with which the evidence of the expert in handwriting is often regarded by the legal profession is illustrated by a capital story that was told recently by Sir Edward Carson in a letter to the *Times*. An Irish counsel in a now forgotten

case began his cross-examination of a handwriting expert with the curious question — "Where's the dog?"

"What dog?" said the bewildered witness.

"The dog which the judge at the last assizes said he would not hang upon your evidence."

How closely two distinct handwritings may resemble one another was shown in a celebrated case in which handwriting experts were proved to be utterly mistaken. This was the trial of Sir Francis Truscott, a former Lord Mayor of London, at the Old Bailey in 1879.

It was asserted that the defendant had sent a post card to a friend named John Kearns, who had at one time served with him upon the City Council, accusing him of a criminal offence and warning him that he was being watched by the police.

At the trial evidence was given in the most positive manner by a lady who was acquainted with Sir Francis Truscott to the effect that the moment she had been shown the card she had recognised the writing as his.

This opinion was supported by Charles Chabot, an expert in handwriting, who stated in the witness-box that he was certain that the writing on the post card had been done by the same individual who had written certain letters of the defendant which he had examined. The similarities between the two writings were, he asserted, too close not to have been the work of one individual.

Evidence of the same character was then given by Netherclift, who swore that from a minute comparison of the libellous post card with letters in the admitted

writing of the accused there could be no doubt but that they were written by the same person.

The defence was opened by a witness named Smith being put in the box. He stated that he knew both Mr. Kearns and Sir Francis Truscott, and was aware that the friendship between them had ceased. He was then shown the post card and asked whose was the handwriting upon it.

"I wrote the post card," he said. "It is my own writing."

Answering further questions, this witness stated that he had been abroad when the charge was brought against Sir Francis Truscott, and that as soon as he learned what had happened he had made an affidavit that the writing was his.

The father of this witness produced post cards written by his son and stated that the libellous post card was in the handwriting of his son and not in that of Sir Francis. Evidence was also given by another witness who knew both Sir Francis and Mr. Smith, and who had no doubt but that the post card was in the handwriting of the latter.

At this stage the jury intimated that they had heard sufficient, and brought in a verdict of "Not guilty."

Mr. Justice Wills records a case in which a bank clerk being shown a forged signature swore positively that he had written it, while he was doubtful as to the authenticity of signatures that were undoubtedly his.

Another instance of the way in which writing may be so skilfully imitated as to deceive even the man whose writing it purports to be is afforded by the trial of a solicitor named Shaw at the Derby Assizes in 1861.

He was accused of having forged a mortgage, and at the trial a client of his named Abel went into the witness-box and in all good faith swore that his genuine signature upon a document was not his, while he recognised the forged signature as his genuine writing.

It was proved conclusively, however, at a subsequent action that was brought three years later, in connection with the forged deed, that Abel's signature upon it had been forged, and the convicted solicitor was brought into court to give evidence that he had himself signed the document.

Another curious example, also cited by Wills, of the uncertainty of evidence as to writing was that of a trial in which a deed that was produced bore the signature of Lord Eldon. The solicitor in the case had no doubt as to this being a genuine document, and yet it was positively stated by Lord Eldon that he had never witnessed any document in his life.

The cases of wrong conclusions as to handwriting have been as numerous as those of mistaken identity of person, and have had as tragic consequences.

The notorious case of Beck will occur to everyone as an instance of a man being not only wrongly identified, but of being also the unfortunate possessor of a handwriting that had a close resemblance to the writing of someone else.

The two false identifications combined were sufficient to send an innocent man to prison, and it was long before it was established that the witnesses upon whose evidence he had been convicted had been utterly mistaken both with regard to his identity and his handwriting.

CHAPTER VII

FORGED DOCUMENTS

Use of Microscope—Erasures—Photographic Methods—Typewritten Matter—Examinations of Charred Fragments—Forgery of Bank Notes.

The most valuable methods of detecting forgery have been based upon the use of the microscope, which will frequently reveal alterations that are quite invisible to the naked eye.

For instance, a letter may have been so carefully erased as to defy detection by ordinary examination, but a microscopical examination will show the slightly roughened surface of the paper, where the fibres have been disturbed in the process of erasure. A notable example of this was seen in the Whalley will case, an account of which is given on a later page, and numerous instances of the same kind have come under the direct observation of the present writer.

In one of these cases, which was settled before it reached the courts, a letter which was to be put in evidence in a dispute as to some property had originally contained the words "your house," but the "y" had been skilfully erased, so that the words read "our house."

When the paper was held to the light it showed an almost imperceptible thinness at that place, but under the microscope the ruffled fibres on the surface of the paper where the sizing had been scratched off, were very noticeable.

Skilful forgers guard against this obvious sign of alteration by treating the erased place with a solution of rosin in spirit, which leaves a fine shiny layer upon the paper similar to that of the original sizing.

A treatment first with hot water and then with alcohol will remove this coating of glue or rosin, and when the paper has been dried again it will be found that this part, which will now be free from its protective layer, will absorb a drop of water more rapidly than the rest of the surface.

Another simple test to reveal erasure is the use of iodine vapour, which will often cause a blue coloration (due to starch) upon the moistened surface from which sizing has been removed, but will only colour the remainder of the paper brown.

This test gave a very pronounced result in the examination of the letter to which reference has been made, in which erasure of the letter "y" had been suspected from the general appearance and microscopical examination of the surface of the paper.

The course of the tests described above should be followed under the microscope, although in some instances the fraud is so extensive as not to require any magnification. As a rule, however, it is preferable to use only one drop of a reagent, and to follow closely under a low power of the microscope, its action, both upon the material of paper and upon the ink of any writing, which it may render visible.

The detection of mechanical erasure, which as was mentioned above, is frequently indicated by the paper being thinner and more transparent at that place, is often rendered more certain by photography.

Thus if the document on which was the suspected erasure is placed between a strong light and the camera, the negative will show a darker area corresponding to the place where more light was transmitted through the paper.

A photograph taken in direct light would probably in such a case show nothing, but in a negative taken with the light falling obliquely upon the paper, the fibres that had been roughened by the erasure would be visible, unless a subsequent treatment with glue or rosin had been used to conceal the injury to the surface.

Ink applied to the surface of paper from which the sizing has been removed will show more or less tendency to spread, as upon blotting paper, and although this may be so slight as to escape the notice of the naked eye, it will be plainly visible under the microscope, and on a photographic enlargement the rough edges of the marks will be very pronounced.

Every little fault or attempt at touching up will be brought into prominence, and in cases where writing has been removed by the use of chemical reagents the slight yellow stain which is frequently formed upon the paper—a stain so trifling that it would not ordinarily attract notice—will appear as a dark blotch upon a photographic reproduction. It has frequently been claimed that it is possible to distinguish between different kinds of ink by means of photography. Since inks contain provisional colouring matters which cause the dried pigment upon the paper while apparently black to be in reality red-black, blue-black, etc., it was asserted that such

differences would be made manifest in photographs taken on an ordinary plate, and still more by the use of colour-sensitive plates.

The present writer, however, has been unable to confirm these statements. It is true that differences in intensity appear upon the negative, but these are not any more pronounced than the differences obvious to the eye in the writing, and the use of special plates and screens does not give any more satisfactory results.

The chief use of the photographic methods is to distinguish differences in form rather than in colour, and to record them for purposes of demonstration.

One direction in which photography is particularly useful is in deciphering the words in faded ink upon old documents, for the yellow colour of the ancient vellum is due to the formation of iron oxide.

Of recent years photography has supplied another valuable means of detecting alterations in documents, and it has been found particularly useful for demonstrating to a judge and jury the results of a microscopical examination.

Photographic reproduction and enlargement has the advantage over chemical methods of not producing any alteration in the ink or paper, and in some instances is just as effective as the latter. In the examination of wills, for instance, it is necessary to obtain the express permission of the President of the Probate Court, before any chemical tests may be applied to the document, and except under special circumstances such permission would certainly be refused.

All the details of the writing and of the texture of

the paper may be recorded by the camera, and a photographic enlargement may then be made to any required extent, so as to obtain what practically amounts to a record of the microscopical appearance. And the process has the additional advantage over microscopical examination that a large portion of the magnified surface may be examined at the same time, whereas in studying a document under the microscope, the view is restricted to a very minute portion of the surface.

With the more general use of the typewriter it became possible to write libellous letters with much less risk of detection than in the case of letters written in ordinary pen and ink, for the machine eliminates the personal characteristics of the writer.

The differences between various makes of typing ink are also less pronounced than the differences between different kinds of writing ink, and the proof of the identical character of two inks has, therefore, usually less significance.

There are, however, certain typewriting inks, which are characteristic from the fact that they contain finely-divided carbon, and are, therefore, unlike most typing inks, exceedingly permanent, and it is also possible to distinguish between the more common violet aniline inks by the different degrees of resistance that they offer to bleaching reagents.

Although it is not possible to identify the writer of a typed document by a study of the typing it is frequently not a difficult matter with the aid of the microscope to identify the machine upon which it was written.

The principle underlying such identification is that the letters upon a new typewriter are arranged at very nearly equal spaces from each other and produce a fully horizontal line of writing. But after being in use for a very short period some of the letters are certain to get out of alignment, and to give faults in their relative position, which are usually reproduced every time those letters are struck. Thus, for instance, an " a " may be a little above the line and an " r " fall too much to the right, and these peculiarities will almost invariably recur throughout every scrap of writing done upon that machine, until the alignment has been adjusted. In no two machines are exactly the same variations in the relative positions of the different letters likely to occur. The chances of this happening is exceedingly remote, for there are some seventy letters and signs upon a typewriter.

A practical illustration of the value of the evidence thus afforded, was seen in a case that occurred about a year ago. It was suspected that a letter had been written in collusion with a clerk in a certain office, and proof of this was thought likely to have considerable influence upon the issue of the trial.

When this letter, which was in typewriting, was compared with another letter that had unquestionably been written in that office it was found that the faults of alignment in both were identical. Wherever a letter, or combination of letters, in the one fell above or below the line, the same thing occurred in the other, and wherever there was unequal spacing between two letters the distances were invariably equal in both cases.

In addition to this, the ink, which was of the

violet type, contained the same pigment, and the watermarks on the two sheets of paper were the same.

There could, therefore, be no reasonable doubt as to the two letters having been written upon the same machine. As a matter of fact, this proof of collusion did not carry the weight that had been expected, for the case was decided upon issues that were not affected by such proof.

With the aid of a measuring-scale upon the eye-piece of the microscope it is possible to measure the thickness of strokes of writing only ten thousands of an inch across, and in some cases to prove in this way that a certain part of a document was written at a different time or with a different pen than the remainder of the writing.

In attempting to reproduce a signature a forger will probably make a preliminary outline with a blacklead pencil and then go over this with ink.

The imperfect removal of the pencil marks may then betray the fraud, as in the Whalley will case described on another page. In some instances the particles of the graphite may be seen with the aid of the microscope to project beyond the upper layer of ink.

Additions and alterations made to the letters in writing are clearly visible when magnified, and may be demonstrated in court by means of a photographic enlargement. Any irregularities in the edges of the letters or any break between one part of a letter and another appear much more pronounced when examined in this way, for all faults are enormously intensified. Thus the figure "0" might be altered into "9" by

the addition of a stroke, or a " 3 " turned into an " 8," but it would be practically impossible to do this in such a manner as not to show when slightly magnified.

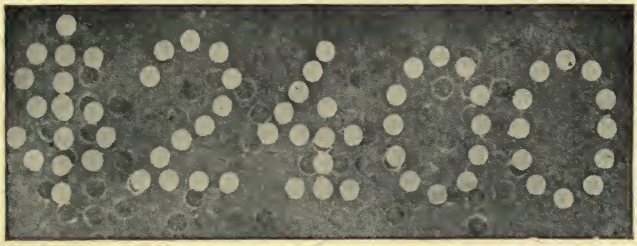
The accompanying illustrations, for which the writer is indebted to Mr. A. S. Osborn and the proprietors of *Knowledge*, will make these points clearer. In Fig. A is shown the result of an attempt to change the number " 11 " into " 17 " by the addition of a stroke to the top of the second " 1." The small inset represents the appearance of the fraudulent alteration, while beneath it is seen the microscopical enlargement, in which the joining of the added portion is plainly visible.

Occasionally it happens in fraudulent alteration of writing that a stroke or part of a letter may touch some of the original writing, and betray itself by being above instead of below the older letter.

Thus in Fig. B the words " in full to date " were added to the receipt after the signature had been put, and it will be noticed in the enlargement of the cross stroke of the " t " in " date " and the top of the capital " C " in the signature (Fig. C), that the alleged older writing comes uppermost. The point at issue in this dispute was whether the receipt referred to a whole sum or only to a payment on account.

The writer in the course of his experience has seen many similar fraudulent alterations, but has never met with a case like that described by Mr. Osborn, where the perforations which are in common use as a means of preventing fraud had been carefully filled in, and new perforations made. Fig. D shows that a fraud of this kind may be detected with certainty

ALTERED NUMBER



ALTERED PERFORATION

Detection of Forgery by means of the Camera and the Microscope

By kind permission of "Knowledge"

by the aid of the microscope, the edges of the original perforations appearing as rings of a lighter hue.

The subsequent addition of writing to a document was in one instance detected by the fact that the paper had been folded before the later writing was introduced, and in the crease thus formed the sizing on the surface of the paper had become worn, leaving the fibres more porous. Here the ink had shown a tendency to become diffused, and the blurred edges of the lines thus produced were very manifest.

Even where paper has been so completely charred that no signs of writing remain visible, it is frequently possible to render the characters visible once more by continuing the incineration until only a white structure of ash remains.

When the writing was originally in ink the characters will usually appear in reddish-brown marks (due to the iron in the ink) upon the white background of ash. In the case of inks that do not contain iron, or when the writing was in carbon or aniline typing ink, this method of incineration will prove unsuccessful.

Writing that has been done with an ordinary lead pencil can usually be rendered visible by carefully regulating the heat during the incineration, so as not to burn away the graphite. Marks done with a red pencil are, as a rule, burned away with the paper, but blue pencil marks usually persist owing to the presence of an iron compound in the pigment.

In the case of printing inks it is rarely possible to render the characters visible again, except when, as in blue printing ink, some iron pigment was present.

The limits of this method of reading writing upon charred paper have recently been investigated by Habermann, who finds that a main essential for the successful working of the process is that the paper itself shall yield a coherent white ash. In the case of common varieties of paper, especially printing paper, which are loaded with china clay and other mineral matter, this condition is admirably fulfilled.

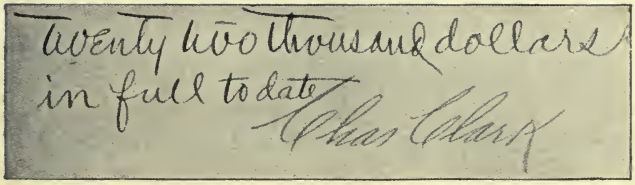
With pure rag papers, however, the ash is much less coherent and is too small in quantity to leave a background. Even in such cases it is possible to increase the amount and coherence of the ash by painting the reverse side of the charred paper with a solution of a mineral fixative agent, such as aluminium acetate. On now drying the paper and continuing the ignition the added substance leaves its own white ash which binds together the ash of the paper.

The fragments of white ash upon which writing has been made visible will obviously be extremely fragile, but they may be rendered firm enough to handle by applying a solution of collodion to the reverse side, which on evaporation leaves a layer of nitro-cellulose similar to that with which incandescent gas mantles are coated.

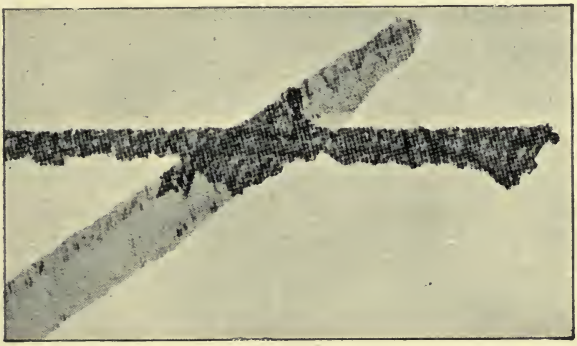
Any shrinkage or distortion of the letters in the writing caused by the contraction of the ash of the paper during the incineration is obviated or minimised by burning the carbonised paper very slowly.

A record of the revivified writing may also be made by means of photography.

The one pound notes issued by the Bank of England until as late as 1826, appear to have afforded peculiar



A FORGED RECEIPT



PORTION OF THE SAME

By kind permission of "Knowledge"

TESTS TO DISTINGUISH OLD FROM NEW INKS

(SEE PAGE 110)

temptations to forgery, judging by the number of persons convicted of the offence.

The statistics on this point are very remarkable. Between the years 1797 and 1811, 471 people were convicted of uttering the notes or having them in their possession.

In 1814, the number of fraudulent one pound notes detected was 10,342; in 1815, 14,085; in 1816, 21,860; in 1817, 21,241; and during the first three months of 1818, 8,937.

The ease with which the notes could be imitated, and the readiness with which they could be circulated, caused hundreds of people to take up the trade of forgery, until at length whole days were occupied at the Old Bailey with the endless trials and convictions.

Much indignation was expressed in the newspapers that the Bank had not issued notes which could not be imitated, and as a result of this outcry, a committee of scientific men was appointed to examine and report upon the best means of checking the evil.

Their report stated that they had examined many specimens of engraving, but none that had been submitted to them was proof against skilful imitation. Most of the forged notes had been clumsily imitated, and from this it appeared that the public were quite ready to be deceived by them.

It was commonly believed, though without foundation, that the Bank placed a private mark upon their notes by which they could subsequently be identified.

The general dissatisfaction with the behaviour of the Bank authorities was intensified by the amount

of public money that was spent in the prosecution of the forgers, and the view was freely expressed that the Bank had no right to assume the office of prosecutor.

In the year 1818, for instance, there were 242 prosecutions, the cost of which was £34,357.

So pronounced became public opinion upon the subject that the Bank was forced to allow the culprits to plead guilty to a minor charge, the penalty for which was transportation instead of death.

This became almost a necessity, since there were frequently batches of twenty or thirty convicted forgers awaiting execution, though the death penalty was only exacted in a relatively small proportion of the cases.

During the seven years ending 1825 there were 78,918 males and 14,800 females tried on the charge of forging these notes. Of these prisoners, 17,874 were acquitted, while out of the remaining 75,844 sentence of death was passed upon 7,770, though not more than 579 of these were executed. Even this small proportion gave the terrible yearly average of eighty-three executions.

As it was at that time impossible to stop these wholesale forgeries the abolition of the issue of one pound notes, which took place in 1826, was obviously the only solution of the difficulty.

CHAPTER VIII

DISTINGUISHING INKS IN HANDWRITING

Elizabethan Ink—Milton's Bible—Age of Inks—Carbon Inks —Herculaneum MSS.—Forgery of Ancient Documents.

In order to make clear the principles upon which are based the methods of distinguishing between different kinds of ink in handwriting it is necessary to give some account of the nature of ink.

Ordinary writing ink is essentially a mixture of a decoction of galls (or other substances containing tannin) with a solution of copperas, or as it is now termed, ferrous sulphate. These substances combine with one another to form a tannate of iron, which gradually changes on exposure to the air into another iron tannate, which is insoluble and constitutes the black pigment of writing.

Characters written with a pure freshly-prepared iron gall ink are very faint in colour when first applied to the paper, and it is only after the air has acted upon them that they gradually become dark blue and finally black.

In the old type of iron-gall ink, that which was universally employed down to the early part of last century, inks were exposed to the air or were boiled in order that the insoluble black pigment might form within the liquid, and thus give some colour to the ink when it was first put upon paper. The objection to this is that ink thus prepared is liable to clog the

pen and not to penetrate properly into the fibres of the paper.

In the modern type of inks, therefore, which are commonly known as " blue-black " inks, this method of partial oxidation is not employed, but a colouring matter is added instead, so that the writing has some colour immediately, pending the formation of the black pigment within the fibres of the paper.

The nature of this provisional colouring matter varies in different inks, and no two manufacturers appear to use the same substance for this purpose. In some inks indigo is employed, in others logwood, while the introduction of aniline dyestuffs placed an abundant choice of colouring matters at the disposal of the manufacturer.

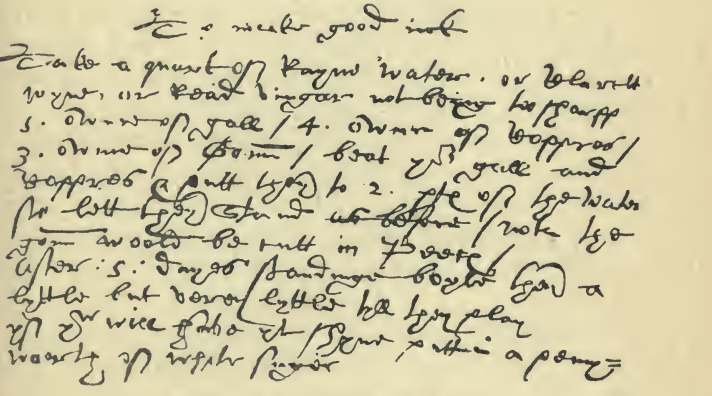
In the case of old inks it would only have been possible to distinguish between writings done with different kinds where some mistake had been made in the preparation of the ink, and a large excess of iron or of galls had been used.

The possibility of such mistakes occurring, however, will be readily understood when it is remembered that ink-making was formerly as much a part of the duties of the housewife as the baking of bread or the making of cordials.

As writing was a polite accomplishment restricted to the educated people of leisure the ink-manufacturer could not have existed, for there would have been no customers, and recipes for the making of ink were therefore handed down for generations.

A particularly interesting example of an early domestic recipe for making ink is shown in the accompanying

figure which Mr. G. Weddell has kindly allowed to be reproduced. This was taken from a collection of old family recipes dating back to the early part of the sixteenth century, and including among its odd assortment of items directions for making everything needed for the household, from apple pasties to cures for the king's evil. This particular recipe, which was



Elizabethan domestic recipe for ink

one of several for making ink, was probably written towards the close of the sixteenth century. It gives directions for soaking the galls in rain water (or claret, or red vinegar) and boiling the liquid, after standing for a few days, with copperas and gum. The whole collection of these recipes, which suggest many a picture of the life in an English household in the sixteenth century, has been published in facsimile (*Arcana Fairfaxiana Manuscripta*, 1890).

Ink made by the rule of thumb methods of the

housewife must have often been very poor stuff, and it is to this cause that we must attribute the want of permanency of the ink in some of the relatively modern writing as compared with that upon manuscripts centuries earlier.

No more interesting illustration of the effect of the composition of old inks upon the permanency of writing can be found than in the various names written in Milton's family Bible, to be seen in the British Museum. It will be noticed that all the entries of the births of himself and the members of his family are in the handwriting of Milton, and that with one exception all the inks are of a good dark tone. The exception is seen in the entry relating to the birth of his daughter Deborah "on the 2nd of May, being Sunday, somewhat before three of the clock in the morning, 1652." Here the ink has faded to a faint brown tint.

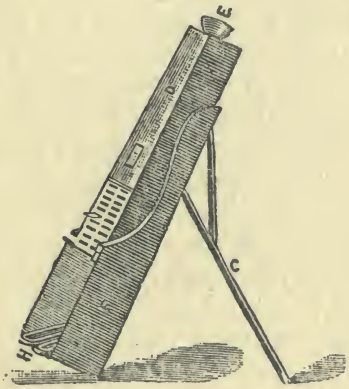
Considerable variations are possible in the proportions of galls and iron that may be used without interfering with the blackness of the pigment, but a deficiency of tannin outside those limits will cause the writing to turn brown. A lack of tannin to combine with the excess of iron present is probably the explanation of this faded entry in Milton's Bible.

It is very probable, too, that tests applied to the freshly-written entries would have shown that the ink in this entry was of different composition from that of the inks in the other entries.

Lovibond's tintometer, an instrument which enables slight differences of colour to be distinguished more accurately than is possible with the naked eye, has

been used in matching the colour obtained in chemical reactions with those given by the colour scales prepared from known or suspected inks.

For recording colour, strips of glass graduated so as to form a series of colour scales are employed in this instrument, and in this way a note can be taken of any given tint.



The Tintometer

The first occasion upon which this instrument was employed in criminal work was in the Brinkley poisoning case, in which the colours of the different inks upon the will and other documents were examined by its means.

The problem of determining the age of an ink in writing is much more difficult than that of deciding whether two writings are in the same or in a different kind of ink.

It is, as a rule, possible to distinguish, with the aid

of the microscope and tintometer, between freshly-written and old writing up to about the sixth day, after which the black pigment has attained sufficient intensity to prevent further differentiation until after the lapse of two or three years or more, when the provisional pigment will have faded or have become fixed by the iron tannate.

In most cases the provisional pigments used offer greater resistance to the action of chemicals, but are infinitely less stable than the iron tannate when exposed to the action of light and air, and eloquent testimony to this difference is given by the comparison of certain manuscripts of the seventh and eighth centuries with typewritten matter in aniline ink, which has been put aside for a few years.

Thus it happens that when characters written in blue-black ink are kept, the blue pigment will gradually fade out, leaving the black pigment; and when this stage is reached the ink in old writing is readily distinguished from ink that has been freshly put upon paper.

Prior to this, however, the blue provisional colouring matter appears to become enveloped in the particles of iron tannate so that it no longer reacts rapidly with chemical reagents.

Thus, if writing done within the last year or two be treated with acetic acid there is an immediate diffusion of the blue pigment, whereas in the older writing, diffusion, if it occurs at all, is very slow and limited in extent.

A still more useful reagent for this purpose is a saturated solution of oxalic acid, which causes the

pigment of relatively fresh writing to give an immediate smudge, but has very little, if any, effect on writing six or eight years old. The differences in the behaviour of old and relatively recent writing are seen in the tests here illustrated, in which the old writing of 1898 was hardly affected by the reagents, whereas the writing done in 1908 gave the results shown.

Both writings were in the same kind of ink and the tests were applied simultaneously.

Speaking generally, a writing done with blue-black ink ceases to show such diffusion after five to six years. When slight diffusion occurs in an older ink it is seen under the microscope to differ in character and only to affect the surface of the letters, whereas the diffusion in an ink written within the last two or three years affects the whole of the pigment in the letters.

The first occasion on which chemical evidence as to the age of blue-black ink has been given in the law courts was in the recent forgery case, in which Colonel Pilcher was accused of forging his cousin's will. This will was alleged to have been written in 1898; and assuming this to have been the case, the ink should only have reacted very slowly with the different reagents; there should have been little or no diffusion with oxalic acid; and if any slight diffusion occurred it should only have been upon the surface of the letters.

The ink upon the will, however, gave an immediate reaction with the different reagents, the blue pigment diffused at once with oxalic acid, and the diffusion extended throughout the whole of the letters. There was thus no doubt but that the ink upon the will had

been written within the last year or two—certainly within the last six years.

Cheques written by the deceased lady during the last thirteen years were also subjected simultaneously to the same tests, and while those written quite recently gave an immediate diffusion, the ink upon those written in 1903 showed only the slightest diffusion in the heaviest writing, and no diffusion at all was obtained upon the cheques written in 1901.

The general adoption of blue-black ink for the old iron-gall ink has made it a simple matter to distinguish between old and new writing, for it is easy to differentiate the two kinds of ink by tests which show the presence of the blue pigment.

The test has been found useful of late in checking the statements of certain claimants of old-age pensions, who, as a proof of their age, have pointed to the entries of date of their birth in old family Bibles.

In more than one instance the results of a scientific examination of the inks have failed to support the claim, for they have proved conclusively that the ink was of recent origin.

It is a simple matter to distinguish between the ancient types of ink that were in use during the early centuries of the Christian era until they were gradually replaced by iron-gall inks and modern writing inks. For the basis of all these ancient inks is lampblack, or some other form of carbon, which is very resistant to the action of reagents. It is for this reason that printing ink, the pigment of which is carbon, is so much more stable than any ordinary writing ink can be. In fact, in order to increase the permanence of

writing inks it has frequently been recommended to add a small amount of some carbon ink.

The most easily obtained preparation of the kind is the commercial Indian or Chinese ink, which consists essentially of a mixture of glue with lampblack in the finest possible state of division.

In order to distinguish between a carbon ink of this nature and an ordinary writing ink all that is necessary is to apply a dilute bleaching agent. The blue-black pigment of the writing ink will then gradually disappear, whereas the fine particles of carbon in the other ink will show little, if any alteration, and may still be discerned under the microscope as minute black granules resting upon the fibres of the paper.

It was by a method similar to this that Sir Humphrey Davy proved that the writing upon papyri found in the ruins of Herculaneum, which was destroyed in A.D. 79, had been done with a carbon ink, of the same nature as that used by the ancient Egyptians and by the Chinese and Japanese at the present day. On none of the Herculaneum MSS. could any trace of iron ink be detected.

The same tests may be applied to determine whether the writing upon a document has been lithographed or has been written with ordinary ink.

An amusing instance of the kind came within the present writer's experience. A sheet of paper upon which was some writing that was believed to have been written by Nelson had been handed down in a family for several generations as an heirloom, and had always been looked upon as a genuine document. The ink had the faded yellow tone of old iron ink, and there

was nothing to show that the writing was not what it professed to be.

Its present owner, however, happened to notice in a museum what appeared to be a duplicate of the manuscript in his possession, and when a chemical test was applied to the ink upon the latter the pigment was quite unaffected. Hence there could be no doubt as to its being a copy of the original reproduced by lithography.

Cases in which it is necessary to distinguish between iron-gall writing inks and printing or other carbon inks occur from time to time in criminal investigations. As a recent example a case that was tried a few months ago may be mentioned. The chief clerk of a firm of merchants had for a considerable time been defrauding his employers, and when suspicion at length fell upon him, endeavoured to conceal his doings by falsifying the entries of previous years in the ledger.

In order to do this it was necessary to abstract certain pages in a particular part of the ledger and to substitute the necessary alterations. Then, finding that the ink of the writing would appear too new, and thus invite inquiry, he added a small amount of Indian ink to an ordinary writing ink, and thus obtained a mixture, which gave an immediate effect of age to the writing. To the naked eye there was nothing to show that these pages had not been written on the dates mentioned on them, three or four years previously, but on applying a weak bleaching agent the fraud was at once made obvious. The iron-gall part of the pigment faded away, but the particles of carbon that had formed the basis of the Indian ink

were left, and their nature could easily be recognised under the microscope. The entries on the other pages in the ledger, which had been written in ordinary writing were completely bleached in the test.

A very curious illustration of the difficulties that beset the forger of ancient documents was afforded by the trial of Humphreys in 1839 in Edinburgh.

The prisoner was the claimant to the earldom of Stirling, and in support of his claim had produced a number of documents supposed to date back to the seventeenth and early eighteenth centuries. One of these purported to be a portion of a charter granted by King Charles I to the first Earl of Stirling in 1639, permitting the succession to the earldom to descend through the daughters of the house.

As witness to this there was appended the signature of Archbishop Spottiswood described as "our Chancellor," whereas as a matter of history the seal had been handed to the Marquis of Hamilton a year prior to the date of the pretended charter. There were also various other anachronisms in the document, such as margins in red ink, which were not used before 1780.

Scientific evidence was also given that the ink upon the pretended charter was not old ink, but ink that had been treated in such a manner as to appear old.

Similar inconsistencies were shown in the other pieces of documentary evidence, and scientific proof was given that the date upon an engraved map, upon the back of which were memoranda supporting the claimant's case, had been added at a later period.

The jury unanimously found the prisoner guilty of forgery.

CHAPTER IX

TWO NOTABLE TRIALS

Trial of Brinkley—Trial of Robert Wood

The first occasion upon which scientific evidence as to the difference of blue-black inks upon a document was given in a court of law in this country was at the trial of Richard Brinkley at the Guildford Assizes in July, 1907, for the murder of Mr. and Mrs. Beck.

Brinkley, at the time of his trial, was about fifty years of age. He was a carpenter by trade, but in the course of his life had turned his hand to many occupations, and for many months had been living upon the proceeds of the property which he claimed to have inherited.

For some time prior to her death he had made himself indispensable to an old lady named Blume, and when, early in 1906, she died, he produced a will in which she had left him her house and money.

On the strength of this will, which he proved in the usual way, Brinkley took possession of Mrs. Blume's house, much to the disgust of her daughter and granddaughter, who had always resented his influence over the old lady. They had no knowledge that anything was wrong with the will, but they determined to test its validity, and accordingly a *caveat* was entered against it.

Brinkley had not anticipated that he would have to prove that it was a genuine document, or that he would have to depend upon the testimony of the men

whose signatures as witnesses were present upon the will. He knew that he could rely upon one of his witnesses, a man named Hird, who had drawn up the will; but the other witness, Parker, refused to perjure himself for Brinkley's benefit. He owned that he had signed a paper when he had been out with Brinkley, but denied that he had ever seen or signed a will.

As Parker's refusal to appear in court meant that the will would be declared a forgery, Brinkley decided that he must be cleared from his path.

He therefore obtained some prussic acid from a man who described himself as "a friend of our dumb fellow-creatures," alleging that he needed it to kill a dog, and this poison he introduced into a bottle of oatmeal stout, which he took round to Parker's lodgings in Croydon, and placed in his sitting-room.

Before Parker came home his landlady, Mrs. Beck, went into his room and seeing the bottle of stout called her husband and daughter, and they all drank the poisoned beer that had never been intended for them. Mr. and Mrs. Beck died the same night, and their daughter, who had taken less of the stout, was very ill, though she ultimately recovered.

Parker was immediately arrested, but being able to prove his innocence was soon set free, and suspicion then fell upon Brinkley who, after the coroner's inquest, was committed for trial on the charge of murdering the Becks, the law being that if you deliberately intend to kill one person and unintentionally kill another you are none the less guilty of murder.

On the way to the police station, after his arrest, Brinkley made the significant statement: "If anyone

says I put poison in stout, he's got to prove it." Up to that moment there had been no mention of poisoned stout.

At the police court proceedings it was proved that the Becks had died from the effects of prussic acid, that Brinkley had bought that poison, that he had bought a bottle of stout in West Croydon, and that he had been seen on the platform at Wandsworth waiting for the West Croydon train.

The motive of the crime was an important link in the chain of evidence, but Brinkley held stoutly to his story that the will was signed by both witnesses in the presence of Mrs. Blume.

Parker's version of his signature, the authenticity of which he did not dispute, was that while he was out with Brinkley one evening the latter asked him to sign his name upon a paper petitioning for an outing, and that they had thereupon turned into a public-house, where he, Parker, had written his name upon a sheet of paper, the upper part of which was folded over.

In order to test the truth of Parker's statement the bottle of ink was obtained from that public-house, and he was told to write his name upon a sheet of paper in that ink, and this paper and the original will were submitted to the present writer for examination.

By the aid of the methods described in the preceding pages it was found that the ink of Parker's signature upon the will and that of the writing upon the piece of paper were of the same kind—an ink readily recognisable from its particularly brilliant blue pigment. In addition to this, three distinct kinds of ink were

present upon the will, the body of the document and the signature of one witness being in one kind of ink, the signature of the testatrix in another, and the signature of the other witness in a third.

When the case came on at the Assizes at Guildford Mr. R. D. Muir appeared for the prosecution, while the prisoner was very ably defended by Mr. Frampton. Every day the judge, counsel on both sides, the prisoner, and many of the witnesses went down to Guildford by a train in the morning and returned to London again in the evening.

Each morning the prisoner when he entered the court appeared quite unconcerned, and chatted with the warders. As is so often the case, he did not seem to realise the gravity of his position.

It was shown in the evidence that he had some knowledge of poisons, and that he had selected one that would disappear more or less rapidly from the body after death. The chemical evidence as to the presence of prussic acid in the bodies was given by Dr. Stevenson and Mr. Bodmer, and was not called in question by the defence.

Evidence was also given by the writer with regard to the inks upon the will, and this, too, was not disputed. In fact, Brinkley, who went into the witness-box, when asked how he explained the fact of three kinds of ink being on the will replied that Mrs. Blume had three different sorts in the house.

He was then asked what had become of two of them, since only one bottle of ink was discovered when the house was searched, and to this his answer was that he had given these to a little girl.

Throughout the trial Brinkley's explanations of damning facts were never supported by any evidence, while for every statement of Parker there was abundant corroboration.

The scene in court on the opening day of the trial will probably never be forgotten by anyone present. A heavy thunderstorm passed over Guildford, and for some minutes such blackness filled the interior of the hall where the Assizes were held that it was barely possible to distinguish the faces of those who were trying a man for his life, excepting when they were lit up by the vivid flashes of lightning. Throughout the storm Mr. Muir continued, in clear incisive tones, which could be plainly heard across the noise of the thunder, to marshal the array of deadly facts, from which there could be no escape for the prisoner sitting motionless in the dock.

To the journalist nothing that means "copy" is sacred, and the representative of one leading London paper whispered to another sitting just behind the writer, "What a pity this couldn't happen while the sentence of death was being passed!"

Mr. Frampton in his speech for the defence dwelt principally upon other possible explanations of evidence, which, as he urged, was entirely circumstantial in character, but he was unable to produce any witnesses to support the assertions of Brinkley.

After a trial which lasted four days, the judge (Sir John Bigham) summed up, and the jury, after a short retirement, found the prisoner guilty.

Until the end he protested his innocence.

The most sensational trial that has taken place in this country for many years was that of Robert Wood, a young artist, in 1907, on the charge of murdering a woman.

The story of the crime itself is a particularly sordid one, but the behaviour of the prisoner in court, and the excited state of public feeling upon the subject gave a profound psychological interest to the trial.

A woman had been found brutally murdered in her lodgings in a small house in Camden Town, and no trace could be found of the murderer.

In the fire-grate, however, had been found some charred fragments of a letter, while in the chest of drawers a post card that had escaped notice had been discovered.

A reproduction of this post card was posted up at the police-stations and published in the papers, and was soon recognised by several people as being in the handwriting of Robert Wood.

In the meantime, Wood, finding that suspicion was likely to attach to him, persuaded a girl of his acquaintance, named Ruby Young, to promise to support his statement that he had been with her upon the evening when the murder took place.

A day or two later Ruby Young became uneasy as to the effect her promise was likely to produce, and asked the advice of a journalist as to what would be the best thing to do, putting the case as a hypothetical one. The man, however, at once saw to what she alluded, and immediately telephoned to the police, and this led to the arrest of Robert Wood.

At the police court proceedings an expert opinion

was given that the fragments of charred paper found in the grate of the dead woman, were in the handwriting of Wood, and evidence was also given by the present writer that the pigment in which the characters were written was identical with that of a marking-ink pencil found upon the prisoner.

For a long time Wood denied that he had had anything to do with these fragments. Subsequently, at the beginning of the trial at the Old Bailey, he admitted that he had written them, though to the end he strenuously refused to admit that the words had the meaning which they appeared to suggest.

He denied that they referred to any appointment made with the dead woman for the day upon which she was murdered.

The proof of the fact that these bits of charred paper had really been written by Wood brought him very close to the scene of the crime, and his attempt to create a false alibi and to get Ruby Young to bear this out still further strengthened the suspicion against him.

The most telling evidence, however, was the statement of a carman, who had, he asserted, seen a man leave the house of the murdered woman at five o'clock in the morning. He had not seen the face of the man, but had noticed that he had a characteristic swinging walk, and when taken to the police station had identified the prisoner among a number of other men, who had been made to walk round the yard, as the man that he had seen coming down the steps of the house.

Other evidence was given as to Wood's having been

seen in the company of the deceased woman on several occasions in the past, although he asserted that he had only known her a few days and had seen her only once or twice. The bad reputation of most of these witnesses detracted from the value of their evidence.

Mr. Marshall Hall, who conducted Wood's defence, made a very brilliant speech, in which he laid stress upon the weak points in the case for the prosecution —the evidence that had been gathered from a tainted source, the complete absence of any motive for the crime, and the fact that the jury were trying the prisoner for murder and not for immorality or lying.

He urged that the keynote in this case was that Wood, who had a great deal of vanity, could not take upon himself the responsibility of admitting what would cause him to occupy a lower position in the estimation of those who had given him their undivided respect and affection.

What, he asked, was the evidence of murder ? The only iota of evidence that turned the scale against Wood was that of the man McGowan, who stated that he had seen the prisoner leaving the house, and had afterwards recognised him by an alleged peculiarity in his gait.

Two months after the arrest of her lover, Ruby Young, for the first time, had said that he had a peculiar gait similar to that described by McGowan, and so far as she was concerned this, said counsel, was a gross and vindictive lie.

The chief evidence called for the defence was that

of Wood's father and brother, who stated that he was at home on the night of the murder, and of a neighbour who had lived beneath them, who had seen Wood come home that evening.

A ticket collector named Westcott, employed at King's Cross station, stated that he lived in the same road, and that on the early morning, when Wood was stated to have been seen, he left his house at five minutes to five. He was then wearing a loose overcoat. Westcott was a broad-shouldered man, and a boxer, and had a brisk swinging walk. It was this man, it was suggested, whom McGowan had mistaken for Wood.

Wood, himself, was put into the box and gave his evidence in a low, and at times, nearly inaudible voice, though he showed not a sign of nervousness. He gave emphatic denials to the questions put to him in cross-examination by Sir Charles Matthews, but he admitted having lied in the matter of the false alibi that he had attempted to set up. He was, he said, in a tight corner, and any man would have done the same if placed in the same conditions.

With reference to the fragments of paper on which were words in his handwriting he denied that they were part of a letter, and suggested that it might have been some scrap of writing taken from his pocket by the dead woman. The theory of its referring to an assignation was, he suggested, an act of imagination upon the part of the prosecuting counsel.

The judge, Sir William Grantham, in summing up the case, pointed out that had it not been for the conduct of Wood himself in telling lies and keeping

back what he knew, there would have been no justification for such a lengthy trial.

The evidence of McGowan was, he said, open to a certain amount of doubt, owing to the fact that the witness had not mentioned at once about having noticed a peculiarity in the walk of the man he saw leaving the house in St. Paul's Road, just before five o'clock on the morning of September 12th.

Then the statements of Ruby Young did not bring the crime home to the prisoner at all. That was a remarkable feature in the case. A number of witnesses for the Crown did not directly connect the prisoner with the crime.

The inference, in view of the evidence of other witnesses, was that Wood in his evidence had been lying all through. But the jury could not convict him because he was a liar. It was mainly in consequence of Wood's own false statements that the prosecution were bound to rely upon the evidence of the other witnesses who had come forward.

"Although," said the judge in concluding his address to the jury, "it is my duty to do all I can to further the interests of justice, it is also my duty to inform the jury that they must not find a man guilty unless no loophole is left by which he can escape. In my judgment, strong as is the suspicion in this case, I don't think the prosecution have brought the case near enough home to the prisoner—with the exception of the evidence of McGowan. That evidence, if implicitly relied upon, would justify you in finding him guilty; but that evidence is considerably controverted. I don't think the identification, even if true, is sufficient to

justify you in finding this man guilty. Therefore, although it is a matter for you alone, it is my duty to point out the effect of the evidence, and it is my duty to point out that unless the effect of the evidence is so conclusive that there can be no doubt in anyone's mind, you should give the prisoner the benefit of the doubt, and say you don't think he is guilty."

It was a quarter to eight in the evening when the jury retired to consider their verdict, and before eight had struck they were back again in court, and had pronounced their verdict of " Not guilty."

Cheer on cheer swept through the court, and for some minutes it was impossible for the judge and the court officers to obtain silence. Men and women thronged round the dock eager to grasp the hand which Robert Wood held out to them over the rail.

Outside, in the street, the dense mob that thronged up to the very doors of the court, took up the cry, and yelled itself hoarse with the words " Not guilty. Not guilty."

The public had long before this decided that Wood was innocent, and the orgies of wild enthusiasm that followed upon the announcement of the verdict were some indication of the tense excitement that had been pent up for so many days. Robert Wood had become the popular hero of the hour.

It is difficult now to account for this hero-worship of a man who had done nothing to justify such worship, except upon the theory of an emotional infection that had destroyed the balance of collective judgment. This want of proportion reached its limit perhaps in an article written for a Sunday paper by one of the

best known actresses. After describing the emotional stress through which she had passed while waiting for the jury to give their verdict she mentioned that she had gone into the hall. There she had noticed a forlorn little figure of a girl wandering listlessly up and down. Someone told her that this was Ruby Young, and for a moment she had felt an impulse to go and speak to her, for she pitied her from the bottom of her heart. And as she looked at her, with tears welling up in her eyes, she thought of Peter when he had gone out and wept bitterly !

It was a matter of the greatest difficulty for those connected with the case to force a way through the surging crowd that was waiting to give a boisterous welcome to the acquitted artist and his solicitor and counsel, and to vent their disapproval upon witnesses who had dared to give evidence against him, and particularly Ruby Young.

For hours she waited, trembling, within the building, for it was not thought prudent to allow her to venture outside ; and it was quite late at night before, disguised as a charwoman, she was able to make her escape through a small door that had not attracted the notice of the mob.

This was the climax of one of the most unpleasant features of the trial, in the course of which several of the witnesses had complained to the judge of the attempts that had been made to intimidate them from giving their evidence.

Another memorable feature in the trial was the behaviour of the accused.

Throughout his ordeal Wood seemed to be more

concerned about the impression he was making upon the spectators in court than about the necessity of accounting satisfactorily for many suspicious circumstances that told against him.

So well did he appear to be able to control his emotions that, as he himself wrote afterwards, he could notice whether one of the actresses who attended the trial day by day, smiled upon him.

Never for one moment did he lose this self-control or appear otherwise than an unconcerned witness of the events upon which his life depended.

This absence of nerves in the accused is what struck most people as one of the strangest features in a strange trial, and caused Mr. Hall Caine, who was present in the court throughout the whole time, to write of him: "That he felt nothing I will not dare to say, that his mental processes were not frequently stirred to such pain as comes of baffling difficulties, but that the ordeal of his trial was a terrible one to him I absolutely refuse to believe. Robert Wood, innocent of the murder of Emily Dimmock, is yet the most remarkable man alive."

In what trial upon a charge of murder has there ever been witnessed the sight of the prisoner, whose life was hanging in the balance, laughing and chatting with his friends, and making sketches of the judge, the counsel, and the witnesses? Even at the most crucial moment of the trial, when the jury had withdrawn to consider their verdict he exhibited no trace of anxiety, but until called below sat calmly sketching, while he waited for their return.

And thus Mr. Hall Caine wondered, as he got the

prisoner to sign his name upon the back of a copy of the charred fragments of the letter, whether "with all his mental alertness, his intellectual activity, his temperamental composure, this was not one of those men, the rare and mysterious men, who lack some necessary quality on the moral side of their nature."

CHAPTER X

SYMPATHETIC INKS

THE so-called *sympathetic inks*, by which is understood inks that give a writing that is invisible, or nearly so, until it has been acted upon by the air or treated with a special reagent, have been put to many ingenious uses by the criminal.

Some five years ago an innocent-looking individual called at the laboratory of one of the leading consulting chemists in London, and asked whether he could be supplied with a writing fluid that would give writing which would fade away in a short time, and also with another ink that would produce words that would be invisible for some time and then appear. He gave as his reason for requiring these that he wanted to amuse a small boy.

The sequel was seen a few weeks later when the same plausible individual was arrested for swindling on the race-course. He had made tempting bets on certain horses, the names of which he had written on slips of paper, and had handed these slips to those who had accepted his wagers.

In a short time the name of the horse on each slip of paper gradually faded away while the name of another horse slowly appeared in its place.

One man to whom one of these slips had been given, having been warned by another victim, hurried away to the police station, and was in time to let the superintendent see the name of an "outsider" replace that

of one of the favourites upon which he had laid his money.

This appears to have been the last detected attempt to use a sympathetic ink upon the race-course. A disappearing ink frequently used for this purpose is a weak solution of starch containing a slight trace of iodine, the effect of which is to produce a faint blue colour. On exposure to the air the colour of writing done with such a fluid soon fades away.

Fugitive dye-stuffs have also been employed as disappearing inks, and some of these, such as quinoline blue, give characters that rapidly disappear when exposed to sunlight.

An ink that is invisible for some time is a solution of silver nitrate in ammonia, which gradually becomes black when acted upon by air and light. Or certain dye-stuffs such as magenta, that have been treated with a bleaching reagent in just sufficient quantity to decolorise them fulfil the same purpose, the original colour gradually reappearing as the oxygen of the air acts upon the pigment.

The earliest inks that were rendered visible by chemical reagents were believed to act by magnetism.

Thus in a medical book of the seventeenth century, written by Brossonius, a "magnetic fluid" is described made from "arseniated liver of sulphur," which only became visible when looked at with the "eyes of affection." This appears to have been nothing more mysterious than an ink of lead acetate, the characters written with which could be rendered visible by exposing them to the vapour of sulphuretted hydrogen.

Inks of this kind were also mentioned, in 1669, by

Otto Tachen, who referred to them as *aquæ magnetice e longinquo agentes,* but pointed out that there was nothing magnetic in their action. The term *sympathetic ink* appears to have originated with Le Mort, who applied it to the lead acetate ink, and later on the name was extended to all secret inks.

The best known sympathetic inks consist of solutions of cobalt salts, the writing done with which changes on heating from a nearly invisible pink to blue. This peculiarity of cobalt to form two series of salts containing different amounts of water was discovered in 1715 by Waiz.

Other compounds that may be used as sympathetic writing fluids include tannin, which forms ordinary ink on the addition of iron sulphate; cobalt nitrate which becomes blue on adding oxalic acid, and gold chloride which gives a purple colour with tin chloride.

Some thirty years ago a patent was taken out by Kromer for the use of a sympathetic ink in detecting any tampering with envelopes. The two dried constituents of the ink, say tannin and iron sulphate, are separated by the adhesive gum upon the envelope, so that should steam be applied to open the letter, the two substances come into contact, and form an ink, which leaves a stain upon the paper.

Printing inks based upon these principles are used in preparing the groundwork of cheques, so that any attempt to remove the writing from the cheque by means of chemical agents will be betrayed by the change of colour upon the body of the paper.

The value of sympathetic inks in detecting an offender was strikingly shown in the recent Sutton

libel case, in which a woman was found guilty of sending offensive cards through the post.

The story is a very remarkable one. For many months during 1908 and the early part of 1909, there was an epidemic of anonymous post cards in Sutton, many people receiving them and no one being able to trace their origin.

Among other people who received these cards was a Mrs. Tugwell, and in some of them it was stated that she and another woman were "not fit members" of a certain congregation. Suspicion fell upon the housekeeper of the Roman Catholic priest, Annie Dewey, and mainly on the evidence of a handwriting expert, she was committed for trial at the Assizes.

The writing on the libellous cards was undoubtedly extremely like that of Miss Dewey, and, as events subsequently proved, was a very skilful imitation of it by someone who wished to throw suspicion upon her. When the Assizes came on, no evidence was offered by the prosecution and the case was dismissed. The libels still continued, however, and Mrs. Tugwell having received more libellous cards, her husband again took the matter up, and Miss Dewey was once more committed for trial in March, 1910. The trial was a very exhaustive one, but no convincing evidence was brought against the accused, who was therefore acquitted.

In the meantime a number of suspicious circumstances pointed to the conclusion that Mrs. Tugwell herself was the author of the libellous cards and letters, and that she had also apparently written those that she had received through the post.

In order to obtain proof of this the police, by arrangement with the postal authorities, marked a large number of stamps with a sympathetic ink, that would not become visible until it had been treated with another reagent.

Instructions were given to the postmaster that these marked stamps were to be supplied to none but members of the Tugwell family.

In April two more libellous post cards were sent to Canon Cafferata, a Roman Catholic priest, and the stamps upon these cards were two of those marked with the invisible ink.

The house of the Tugwells was now watched by the police, and one evening when Mrs. Tugwell was seen coming out, the pillar-box close at hand was immediately cleared of all its letters by an official. Mrs. Tugwell then put two letters in the box, both of which contained foul libels. One of these was addressed to a friend of hers and the other to herself.

The handwriting on both these letters was an imitation of that of Miss Dewey. A warrant was now issued for the arrest of Mrs. Tugwell, and when her house was searched, envelopes having the same water-mark as that of the envelopes containing the libellous letters were discovered. There were also found some French books containing the French phrases used in the letters, and several pieces of blotting paper upon which were words and phrases occurring in libellous letters.

CHAPTER XI

REMARKABLE FORGERY TRIALS

TRIALS—William Hale—The Perreaus—Caroline Rudd—Dr. Dodd—Whalley Will Case—Pilcher, etc.

THE evidence given at the trial of William Hale, in 1728, at the Old Bailey has many points of interest. The accused was charged with forging a promissory note for £6,400.

At this time it was customary for certain privileged persons to frank letters by merely signing their names upon them and adding the word "free."

In this case the forged promissory note bore the words "for myself and partners" followed by the signature, and the Attorney-General pointed out in his speech for the prosecution that this had been done by erasing the two "e's" of "free," inserting an "o" between the "f" and "r," and then adding the additional words.

It was also alleged that the ink in the stroke of the beginning of the letter "m" in the word "my" was in an older kind of ink, and probably originally formed part of one of the "e's" in the word "free."

The old creases in the paper were also such as might have been produced by the folding of the cover of a letter.

Philip Booth denied the authenticity of the handwriting, and was then questioned further :—

"Are they in the same ink ?"

To which he replied, "I take them to be of a different ink."

The prisoner was found guilty and condemned to stand thrice in the pillory, to pay a heavy fine, and to suffer five years' imprisonment. He died the same year in Newgate.

Two celebrated trials for forgery in which evidence as to the authenticity of handwriting was given, took place in 1775, and the justice of the verdicts was hotly discussed for long afterwards. In the first of these trials Robert and Daniel Perreau, twin brothers, were accused of a series of frauds by means of false bonds, while in the second trial Caroline Rudd, who had given evidence for the Crown against the Perreaus in the first trial was, indicted for the same offence.

According to the contemporary accounts Robert Perreau was an "apothecary of great practice," while his brother "lived in the *stile* of a gentleman."

The evidence went to prove that Robert Perreau asked Drummond, the banker, to lend him £5,000 upon the security of a bond for £7,500 which, he alleged, had been given to his brother Daniel Perreau by a Mr. William Adair.

Mr. Drummond questioned the authenticity of the signature upon the bond, which he therefore retained for further examination, promising to return it the next day or to advance the money for the loan. In the meantime he showed it to the Secretary of the Admiralty, who at once agreed that the signature was a forgery.

The next day Perreau willingly accompanied Drummond to Mr. William Adair who promptly denied all knowledge of the bond.

The Perreaus and Mrs. Rudd now attempted to escape in a coach, but were arrested and charged with forgery before Sir John Fielding at the Westminster Guildhall. Similar charges of obtaining money from other persons by means of bonds, all of which had been signed with the name of William Adair, were brought, and after Mrs. Rudd had given evidence that she had forged the signatures at their instigation, the two brothers were committed for trial at the Old Bailey.

At the trial evidence was given by William Drummond that he had had an interview with Mrs. Rudd, that then she had admitted having given the bond to Robert Perreau, and after confessing that she had forged it had begged them "for God's sake to have mercy upon an innocent man."

Robert Drummond, brother of the previous witness, stated in his evidence that when Mrs. Rudd acknowledged the forging of the bond he had expressed doubts whether she was speaking the truth, seeing that the handwriting was so different from that of a woman. Mrs. Rudd had then written the words, "William Adair," upon a piece of paper in writing so like that of the signature on the bond that it had satisfied him and he had burned the paper.

Evidence was next given by a brother of William Adair and by a clerk that the handwriting upon the bond was not that of William Adair.

John Moody, a livery servant of Daniel Perreau,

who was called for the defence, asserted that Mrs. Rudd had two different kinds of handwriting, in one of which she wrote letters to his master as though coming from Mr. William Adair, this fictitious writing being absolutely different from her ordinary writing. He also stated that she used different pens, ink and paper for these forged letters, and that the handwriting upon the bond was precisely the same as that in the fictitious letters.

The defence of both brothers was that they had been deceived by Mrs. Rudd, who had given them the bond as a true one and that they had presented it believing it to be genuine.

Many distinguished persons, including Sir John Moore, gave testimony as to their character, but in spite of this both were found guilty and sentenced to death.

After their conviction great efforts were made to secure a pardon for them, and especially for Robert Perreau, against whom the evidence was not so strong. A petition was presented to the King, and the newspapers were filled with letters in favour of the men, who, as a large section of the public believed, had been the victims of a designing woman. But all was of no avail and they were executed in January, 1776.

Between their conviction and execution came the trial of Caroline Rudd for the same forgeries. She pleaded that having been accepted as a witness for the Crown she ought not to have been prosecuted as a principal. This point of law was referred to the whole bench of judges, whose decision was that the trial should proceed, in order to determine whether the prisoner had spoken the whole truth.

She had charged Robert Perreau with soliciting her to forge the bond and his brother Daniel with forcing her to imitate the handwriting of William Adair. "If," ran the judgment, "she has suppressed the truth she has no equitable claim to favour; and if she has told the truth and the whole truth she cannot be convicted." The trial therefore proceeded.

The principal witnesses were the wives of Robert Perreau and John Moody. Mrs. Perreau stated that she had seen Mrs. Rudd hand a bond to her husband, Robert Perreau, which was signed "William Adair." In cross-examination she admitted that she had never before seen a bond, and when asked how she could recall, after three months, the names, amounts, date, and other particulars upon it replied, "I have the happiness to have a good memory." At the same time she was unable to remember the date or sum in any other document which had been shown to her.

John Moody, Daniel Perreau's servant, again gave evidence as to Mrs. Rudd's using two kinds of handwriting, and asserted that he believed that the signature of Mr. William Adair upon the bond was in the handwriting of the prisoner. In cross-examination he admitted that he had never seen Mrs. Rudd sign the name of Mr. Adair.

The defence was that there had been a conspiracy on the part of the relatives and friends of the Perreaus against Mrs. Rudd, and Christian Hart, a friend of the prisoner, gave some evidence in support of this.

A short speech was then made by Mrs. Rudd, who concluded with an appeal to the jury: "Gentlemen,

ye are honest men, and I am safe in your hands."

After a short retirement the jury gave their verdict in the following curious form: "According to the evidence before us, not guilty."

For many years after these trials sides were taken for and against the Perreaus, and an appeal even was made to Mrs. Rudd to "discover the secrets of a transaction concerning which public opinion has been so much divided." It was plausibly suggested that a declaration of the fact if she was guilty could not then affect her since she had been acquitted by the laws of her country.

Two years after the trial of the Perreaus and Mrs. Rudd came another notorious forgery trial, which created a still greater sensation, owing to the fame of the prisoner as a clergyman and an author.

On the 8th of February the Reverend Dr. Dodd, editor of *Dodd's Beauties of Shakespeare*, once one of the King's Chaplains, and a preacher whom Sunday after Sunday fashionable London had flocked to hear, was arrested on the charge of forging the signature of his former pupil, the Earl of Chesterfield.

For years he had been attempting to live in the style which he thought his position required, and had been in constant difficulties with his trades-people. At length to satisfy some of the more importunate, he borrowed £4,000 in the name of Lord Chesterfield, whose agent he represented himself to be, and gave a false bond for the sum.

The manner in which the forgery was discovered is especially interesting, as being one of the earliest

cases in which the appearance of the ink led to the detection of a fraud.

The bond had been left with a Mr. Manly, who was the attorney for Messrs. Fletcher and Peach, who had advanced the money, and, according to the evidence which he gave at the trial, he observed "a very remarkable blot in the first letter E in the word SEVEN, which did not seem to be the effect of chance but done with design. He thought it remarkable but did not suspect a forgery; yet he showed Mr. Fletcher the bond and blot, and advised him to have a clean bond filled up, and carried to Lord Chesterfield for execution."

When this was done Lord Chesterfield immediately disowned the bond, and Dr. Dodd was thereupon arrested. The attorney advised him that if he returned the money it would be the only means of saving him. Accordingly he raised the £4,000, on the understanding that the bond should be returned to him cancelled, but the charge was not withdrawn, and he was committed for trial at the Old Bailey.

His defence was little more than a confession of guilt and a plea for mercy, and after an absence of only a few minutes the jury found that he was guilty, but recommended him to the royal mercy.

After the conviction unexampled efforts were made to gain a reprieve. In every newspaper there were letters pleading for the life of the prisoner, and the most distinguished men of the day, including Dr. Johnson, then the foremost English man of letters, used their influence on his behalf. Officers of the parish, dressed in deep mourning went from door to door, gaining

signatures for long petitions to the king, and the names thus collected filled twenty-three rolls of parchment. Finally, the Lord Mayor and Council went in state to St. James's Palace imploring mercy for the prisoner. But all was to no purpose, for the king obstinately refused to show any favour to the divine whom he had formerly dismissed from his chaplaincy. His constant reply to all these petitions was, "If I save Dodd I shall have murdered the Perreaus."

On the 27th June, 1777, Dr. Dodd was taken in a cart with another condemned prisoner from Newgate to Tyburn and executed.

His bad luck attended him to the last, for he went cheerfully to the place of execution under the impression that the executioner would be able to cut him down and hand him over to his friends before it was too late to restore him to life. Unfortunately for him the scheme miscarried. A contemporary account thus describes the incident: "Just before the parties were turned off Dr. Dodd whispered to the executioner. What he said cannot be known; but it was observed that the man had no sooner driven away the cart than he ran immediately under the gibbet, and took hold of the doctor's legs, as if to steady the body; and the unhappy man appeared to die without pain; but the groans, prayers and tears of thousands attended his exit."

That Dr. Dodd was hanged at Tyburn is unquestionable, but it was commonly believed at the time that the plan arranged with the executioner had proved successful, and that after being cut down, he was handed over to his friends, who applied restoratives,

and when he was well again smuggled him over to France, where he lived quietly for many years until his death.

There is no reliable evidence of this rescue from the gallows, and although a few years ago it was stated that an account appeared in a newspaper of 1784, of the life of Dr. Dodd in France, the present writer has been unable to find any mention of this in the papers of that date.

The trial popularly known as "The Great Matlock Will Case" is a good illustration of the way in which the internal evidence of documents may afford definite proof of their authorship.

In the year 1856 a surveyor named Nuttall who lived at Matlock died leaving an estate worth about £60,000. He had no near relatives, and the only other occupant of his house at the time of his death was his housekeeper, Catherine Marsden. Her sister's husband, John Else, had been employed as a clerk for many years by Mr. Nuttall, and wrote in a handwriting so similar to the surveyor's that people were frequently at a loss to tell by which of the two their letters had been written.

Nuttall had had his will drawn up by a solicitor, and had made a copy of it in his own writing, which was signed and witnessed. In this copy certain additions benefiting Else had been introduced between the lines. A number of codicils to this will were subsequently discovered when Else had become appointed successor to Nuttall, and these were signed and witnessed by a local farmer and a surgeon, so that

if these codicils were not genuine, there was conspiracy to defraud and perjury on the part of these witnesses. The genuine nature of the signatures was vouched for by a bank clerk, who stated that he would have at once paid money upon cheques so signed.

The case was first tried before a jury at the Derby Assizes in 1859, and the codicils were pronounced genuine. The Master of the Rolls, not being satisfied with the verdict, directed a second trial, which took place in 1860, and this time the jury decided that the codicils were not genuine. The plaintiffs then appealed first to the High Court and then to the House of Lords and a new trial was ordered.

The final trial came on before the Lord Chief Justice (Cockburn) in 1864, and lasted for eight days. The jury decided against the genuineness of the codicils, mainly upon the characteristics of the writing and spelling.

Both Nuttall and Else were bad spellers, but their mistakes were different. For instance, throughout the will " daughter " was spelt correctly; whereas in the codicil it was " doughter," and it was proved that Else spelt the word with an " o," while Nuttall had never done so.

The way in which the " t " was crossed was, however, the most convincing piece of evidence. It was shown that Nuttall's habit was usually to leave the " t " uncrossed, or when he did cross it to do so completely. On the other hand, Else generally made a half-cross to the " t's." In the will written by the testator there were no half-crossings, whereas in the interlineation and the codicils the half-crossed " t's " predominated.

This difference was also brought out in a large number of the letters of the deceased and of Else, which were shown to the jury.

After the verdict had been given against them the plaintiffs attempted, though without success, to obtain yet another trial of the case.

One of the most remarkable trials for forgery that has taken place in this country was the outcome of the famous Whalley will case, which occupied the attention of the courts for three years in the early eighties.

James Whalley, whose fortune was in dispute, died in 1881 leaving £60,000. He had been a reserved man with a touch of eccentricity, and parsimonious habits, and in spite of his wealth had lived for many years in bare lodgings in the house of a railway porter named Thomas, at Leominster.

On several occasions he had expressed his intention of leaving his money to a man named Priestman, who though at the time unaware of the truth, was in fact his natural son ; and there was convincing evidence to show that he had made a will on blue paper to that effect.

After his death, however, no such will could be found, whereas Thomas, the railway porter, produced a will on white paper, in which the bulk of the fortune was left to him.

Certain suspicious circumstances led Whalley's next of kin to challenge the genuineness of the will, and though as yet there was no suggestion of forgery, it was urged that the signature had been obtained by some trick.

After some time a compromise was made, and it was arranged that Thomas should have £17,000 and that the remainder of the money should be divided between Priestman and Whalley's relatives. The will was proved on this understanding.

Here the matter might have ended had it not been for an act of folly upon the part of Thomas.

Priestman invited his solicitor and some friends to come to Leominster to celebrate the occasion, and on their way from the station the carriage drove past the house where Whalley had lived.

As it passed by Thomas stood at the window flourishing a piece of blue paper.

The solicitor, seeing this, jumped to the conclusion that this paper was the "blue will," which Thomas was flourishing out of bravado, to show that he had beaten them. This led him to make further inquiries, which finally resulted in his concluding that the "white will" was a forgery.

As the Court of Chancery regarded the question as one to be decided by a jury the case was tried in the Queen's Bench Division, eminent counsel being engaged on each side.

Evidence was given by David Reece, whose name appeared upon the will as one of the witnesses. He swore that he had never seen Whalley sign a will, but that, together with the other witness, Nash, he had put his signature above Whalley's signature on a piece of white paper on which was some writing in pencil.

Other evidence was then called to prove that shortly before his death Whalley had asked Thomas to write

a letter in pencil to Priestman, to which he had appended his signature in ink. This letter Priestman had never received.

The inference, therefore, from this evidence was that the will had been written upon a sheet of paper from which pencil writing had been erased.

A minute examination of the " white will " disclosed the presence of traces of the pencil marks, and words could be sufficiently deciphered to show that they had formed part of a letter.

The evidence of a number of expert witnesses, including Mr. Holmes, the librarian of Windsor Castle, made clear the manner in which pencil marks upon paper which had apparently been erased might reappear. When india-rubber is passed over the surface of the paper it removes part of the fibres of the material but only doubles over another portion, so that in time the latter may unroll again and uncover the writing which had for a time been concealed by it. It was proved further that the words which had now reappeared upon the paper were in the handwriting of Thomas.

The expert evidence that was brought fully confirmed the story of the witness Reece, and the " white will " was pronounced a forgery.

Subsequently Thomas was tried on this charge and was convicted and sentenced to fifteen years' penal servitude. It is strange to reflect that had it not been for his being unable to resist the temptation of showing his triumph over his rivals, by flourishing a blue paper, his ingenious fraud would in all probability never have been detected.

It is scarcely likely that this paper was the original "blue will." In any case, the latter was never discovered, but the Courts held on the evidence laid before them that its intention should hold good, and that the money should go to Priestman.

An elaborately designed forgery was detected in 1891 by the evidence furnished by the different documents. An action was brought by a man named Howe against the executors of a Mr. Ashton to recover £1,375, which he alleged, had been given him in a cheque shortly before the testator's death.

The body of the cheque was admitted to be in the handwriting of Howe who said that he had written it at Ashton's request.

The cheque was signed "B. Ashton," whereas in the cheques (produced by Mr. Ashton's bank) for many years previously, the signature was invariably "Benj. Ashton," and the shorter signature was only employed in letters. The evidence went to show that Howe had traced the signature from one of these letters.

A further discrepancy was apparent in the form of the figure "seven," Howe invariably forming it laboriously and with a vertical stroke at the top, whereas Ashton had always made it in a continuous stroke. In support of his statement Howe produced some memoranda of sums due to himself, which he asserted to be the handwriting of Ashton.

In these the figure seven was invariably formed in the same way as Howe made it, while the figure was never made in that fashion by Ashton.

To account for one sum of £200, which he claimed

to have lent to the deceased, Howe stated that he had borrowed the sum from his mother-in-law, and in corroboration produced a promissory note which he said he had given her at the time.

The note was dated 1889, and the date-mark to have coincided with this should have been "89." An examination of this document suggested to the judge, Mr. Justice Wills, that there had been some tampering with the date. A hole in the paper came where the "8" should have been, the explanation offered for this being that the paper had been put upon a file. The appearance of the curve of what was left of the first letter, however, was not like the curve of an "8," and by carefully working at the back of the paper with an instrument, the torn edges of the hole were pushed back into their place, and the figures of the year 1890 were made plainly visible.

So carefully thought out had this fraud been that it took twelve days to unravel the whole matter. After the exposures described above Howe naturally lost his case, and the papers were sent to the Public Prosecutor. Subsequently Howe was tried at the Old Bailey for forgery and convicted.

The trial of Frederick Pilcher at the Old Bailey in July, 1910, on the charge of forging his cousin's will, was notable as being the first occasion upon which chemical evidence as to the age of modern inks has been given.

Pilcher, who was a naval architect and colonel in the Territorials, in Liverpool, had for many years been on very friendly terms with his cousin, Marian Lilian

Kerferd, and had been entrusted by her with the management of some of her property.

Miss Kerferd died in March, 1909, leaving an unsigned will in which she divided the bulk of her estate, amounting to £20,000 to £30,000, between various relatives, while only £130 a year was left to Colonel Pilcher, whom she had appointed her executor.

Shortly after her death Pilcher produced a signed will bearing the date of 1898, which he stated he had found among the papers of the deceased, and in this will he was left the whole of the property and appointed sole executor.

He obtained probate of this will and took possession of the estate, dealing liberally with the members of the family mentioned in the unsigned will.

The relations, however, were not satisfied with this state of affairs, and Mr. Frank Stokes, as next-of-kin, brought an action, which Colonel Pilcher did not defend, and succeeded in getting the probate set aside, and the deceased lady was declared to have died intestate. In the meantime the prisoner had succeeded in spending about £5,000 of the estate.

When arrested he stoutly denied that the will was a forgery, but after evidence had been given at Bow Street he was committed for trial. The writing upon the will showed a close resemblance to that of Miss Kerferd, but the bank manager of the deceased lady stated in the witness-box that in his opinion it was an imitation.

A remarkable fact was brought out in his evidence. Up to the year 1903 Miss Kerferd had invariably

formed the letter with a particular loop, and this was seen upon all the cheques, which had been retained by the bank. After that date, however, she made her " k's " in a totally different manner, and the looping of former years never occurred in any of her writing. Now in the will alleged to have been written in 1898 it was significant that the " k's " were formed in the manner of later years, and not as Miss Kerferd made them in 1898.

Certain mistakes of spelling in the will were also characteristic of the prisoner, whereas Miss Kerferd never made such slips. The names of the witnesses upon the will, which by the way were also wrongly spelled, were those of men who had been dead several years, but their relatives gave evidence that these signatures were not genuine.

Evidence was also given by the present writer as to the age of the ink upon the alleged will. The body of the will and the signatures of both witnesses were all written in the same kind of ink—a fact of importance in connection with the half-confession subsequently made by the prisoner.

On his appearance at the Old Bailey, Pilcher was defended by Mr. Marshall Hall, and after two days' trial, he acted upon the advice of his counsel and agreed to plead guilty to uttering the will, though he persisted in his denial of having forged it.

When the prisoner's counsel rose to make this statement there was dead silence, for everyone in court was aware that something unusual had happened, and there passed over the room one of those feelings of tension that make each individual in a crowd lose

sight of everything except the unfolding of the drama before them.

After calling several witnesses to the good character of the prisoner, Mr. Marshall Hall made a strong appeal for mercy. Colonel Pilcher, he said, had been a very intimate friend of this lady, who had frequently expressed the intention of leaving him her money. Unfortunately, having put off signing her will from day to day, she had died without carrying out that intention, and unluckily for him the prisoner had found a will among her papers, but without the signatures of the testatrix or witnesses. He now owned that the signatures were not genuine, but did not know how they had been put upon the will. In uttering the will he had only been attempting to carry out the wish of the dead woman.

In mitigation of his offence it was pointed out that he had not spent all the money he might have done, that he was over sixty years of age, and that his wife who had known nothing of this unfortunate liaison of her husband freely forgave him for any pain he might have caused her.

Before sentence was passed Mr. Muir, who conducted the case for the prosecution, protested against the explanation of the finding of the will that had been given in this confession, and said that in face of the evidence that the ink upon the will was not more than six years old he could not accept the view that the prisoner was not the forger of the document.

The judge, in passing sentence, said that even now the prisoner had not made a clean breast of the matter, for they were still in the dark as to who had signed

the names upon the will. However, taking into acccount the good character that had been given to the accused by those who had known him, and the points urged in his favour, he did not think that the extreme measure of penal servitude was deserved, and the sentence would be one of three years' penal servitude.

CHAPTER XII

IDENTIFICATION OF HUMAN BLOOD AND HUMAN HAIR

STRUCTURE of Blood—Human Blood—Blood of Animals—Blood Crystals—Libellers of Sir E. Godfrey—Trial of Nation in 1857—Physiological Tests—Precipitines—First Trial in France—Gorse Hall Trials—Human Hair—Hairs of Animals.

IN its structure blood may be described as a colourless fluid, the *plasma* having in suspension small solid substances—the red and white corpuscles. The plasma may be separated into a coagulated body termed *fibrin* and a transparent liquid called the *serum*. When blood coagulates, or forms clots, it forms a solid mass in which the red corpuscles are bound up in the fibrous mass of fibrin. The process of coagulation is promoted by moderate heat, slight dilution with water, and exposure to the air, while it is retarded by cold, strongly heating, great dilution and the addition of various chemical agents.

The red corpuscles differ in size and shape according to the species of animal. Thus in human blood and in the blood of most mammalia they appear as double concave circular discs, while in the blood of the camel and in that of birds, reptiles and fish the red corpuscles are elliptical in form.

The number of corpuscles present is also subject to great variations, the blood of amphibia and reptiles, for instance, containing remarkably few. The following

numbers in 100 parts of the blood of different animals have been recorded: Horse, 53; pig, 43·5; ox, 35; dog, 35·7; and man, 48 corpuscles.

The colour of blood is due to a compound known as hæmoglobin, which constitutes about 40 per cent. of the substance of the corpuscles. In the bright red arterial blood the hæmoglobin is present in the form of oxyhæmoglobin, and the latter may be separated in crystalline form by suitable treatment of the separated red blood corpuscles. These crystals differ in the case of different animals both in their chemical and physical characteristics, and have very different forms.

There are also similarly pronounced differences between the microscopical appearance of oxyhæmoglobin crystals from human blood and from that of various animals. The crystals from human blood are in the form of long rhombic needles; those from the blood of the horse are quadrilateral prisms; the blood of the guinea-pig, rat, and many birds yield rhombic tetrahedea; while that of the squirrel gives hexagonal plates.

Crystals of other compounds of hæmoglobin, such as hæmin, differing in the case of different species of animals may also be prepared, and the identity of oxyhæmoglobin may also be proved by its characteristic appearance in the spectroscope.

It is, therefore, under favourable conditions, not a very difficult matter to distinguish between the fresh blood of, say, a man and a squirrel by means of these characteristic differences. It is rarely, however, that the problem is presented in such a simple form in

criminal work, in which usually all that is available for the investigation is the dried stain upon some garment or the clot upon a rusty knife.

One of the most widely employed tests is to dissolve a little of the material in acetic acid containing a little common salt, to apply a gentle heat to the microscope slide, and then to notice under the microscope whether hæmin crystals are formed.

Where the stain is upon iron it is often impossible to prepare hæmin crystals, and in such cases hydrogen peroxide is used as a reagent. This compound, when brought into contact with a fragment of the material moistened with alkaline water, gives off in the presence of blood, bubbles of oxygen, which gradually form a white scum.

Experiments made by M. Cotton have shown that the blood of different animals varies in the intensity of its action upon hydrogen peroxide. Thus human blood liberates about twice as much oxygen as the blood of the horse or pig, nearly four times as much as that of the ox and guinea-pig, and about ten times as much as the blood of the sheep.

Unfortunately other animal fluids have a similar action upon hydrogen peroxide, and the test can therefore only be regarded as corroborative evidence of the results obtained by other tests.

Attempts have sometimes been made by murderers to remove blood-stains by treatment with chemical agents, so as to prevent their identification.

For instance, in the trial of Misters for murder at Shrewsbury, in 1841, a solution of alum was found in his room, and it was supposed that he had removed

the blood from his shirt by treatment with this. He was convicted, however, upon other evidence.

The identification of blood-stains upon rusty weapons is a more difficult matter than in the case of stains upon linen.

The action of the acid salts of fruits upon the iron may produce an appearance very similar to that of a blood-stain, the citrate of iron formed having a reddish colour which on more than one occasion has misled even a surgeon.

A case of this kind happened in 1838 in Paris. A man who had been accused of murdering his uncle, whose heir he was, was found to have a knife on the blade of which were stains, which everyone who saw them said were blood-stains.

A chemical examination, however, which was made in the presence of the magistrate and the prisoner, proved that they consisted of citrate of iron, and had been produced by cutting a lemon and neglecting to wipe the blade after use.

It has frequently happened in the past that the opinion of policemen or witnesses without any special knowledge of the subject has been taken in criminal cases on the point whether stains upon clothes or on a weapon consisted or did not consist of blood.

This practice was obviously a dangerous one, since even by the modern methods of examination it is not always a simple matter to be sure of the fact.

Until a comparatively recent date the tests for blood-stains were based upon bringing the colouring matter of the blood into solution and applying chemical tests to establish its identity.

The necessity for scientific proof of the presence of blood-stains is shown by numerous cases in which stains of similar colour have at first been attributed to blood.

Thus in a case related in Taylor's *Forensic Medicine* a man was arrested in 1840 on suspicion of being connected with a murder in Islington. He had in his possession a sack on which were numerous stains supposed to be dried and coagulated blood. When these were examined, however, they were found to be due to red paint.

In another case, a man who was suspected of a murder was found to have red stains on his shirt and collar, but as these would not dissolve in water they could not have been due to blood. Subsequently it was found that they had been caused by the man going out in the wet with a red handkerchief round his neck.

An early example of the way in which the evidence of an unskilled witness has been accepted upon the subject of blood is seen in the evidence given in 1682 at the trial of Thompson, Pain and Farwell for libel.

The libel arose out of the earlier trial in 1679 of Robert Green and others for the murder of Sir Edmund Godfrey, who had been waylaid and apparently strangled. This trial was one of those arising out of the so-called Popish Plot, and upon the evidence of Titus Oates, Miles Praunce and others the prisoners were convicted and executed.

Subsequently a letter to Mr. Praunce appeared in *The Loyal Protestant Intelligence*, which sought to make out that false evidence had been given at the murder

trial, and that Sir Edmund Godfrey had not been strangled at all, but had committed suicide.

In the words of the prosecuting counsel for the prisoners—"they say that if a man or any other creature be strangled or hanged and the body cold and the blood settled in the veins (as he must be if your evidence be true, meaning the evidence of the said Miles Praunce). Run twenty swords through such a body not one drop of blood will come out; but, on the contrary, his body when found was full of blood. So that they do aver that that wound that he received by that sword must be the cause of death."

William Batson, who was one of the principal witnesses for the prosecution, stated: "They showed me in a ditch where they said he lay some blood. I cannot say it was his blood; and going a little further I saw some more whitish blood, and this is all I can swear."

The Lord Chief Justice (Scroggs) then asked if the weather had been frosty, to which the witness replied: "My lord, I cannot tell whether it was, but I will assure you the blood looked to me more like blood that was laid there than anything else."

After a lengthy trial, in which the main evidence of the former trial, which was quite unconvincing, was repeated, the prisoners were found guilty of traducing the justice of the nation and two of them were sentenced to stand for an hour in the pillory and pay a fine of £100 each, while the third escaped with the fine only.

Where stains have been found upon the clothes or on a weapon in possession of an accused person and have been proved to consist of blood, the defence has

frequently been set up that they were caused by the blood from a sheep that had been killed or from handling game.

Ten years ago, prior to the discovery of the serum test, it would not have been possible, except in the cases where the blood corpuscles could be examined, to prove or disprove this except by corroborative evidence. There was no chemical means of determining whether an old blood stain had been caused by the blood of a man or that of an animal.

Taylor, writing in 1844 upon this point, observes: "Some French medical jurists state that by mixing fresh blood with a certain portion of sulphuric acid and agitating the mixture with a glass rod a peculiar odour is evolved which differs in the blood of man and animals, and also in the blood of the two sexes. This odour, it is said, resembles that of the cutaneous exhalation of the animal, the blood of which is the subject of experiment. They have hereby pretended to determine whether any given specimen of blood had belonged to a man, a woman, a horse, sheep, or fish. Others pretend that they have been able to identify the blood of frogs and fleas!"

As Taylor pertinently observes of this: "There is probably not one individual among a thousand whose sense of smelling would be so acute as to allow him to state with undeniable certainty, from what kind of animal the unknown blood had really been taken. Any evidence short of this would not be received in an English court of law."

On the first occasion upon which scientific evidence as to the difference between the blood of man and of

animals was given in a criminal trial the remarks made by the judge (Lord Chief Justice Cockburn) to the jury showed that he was sceptical as to the powers claimed by the chemical witness of distinguishing between different kinds of blood.

In this case, which was tried at the Taunton Assizes, in 1857, a man had been found with his throat cut, and collateral evidence pointed to a man named Nation being the murderer. When he was arrested he was found to have a knife upon him on which were stains that appeared to be blood, but the prisoner accounted for these by saying that he had recently been cutting raw beef with the knife.

The chemical evidence, however, went to prove that coagulation of the blood had not occurred until after it had come into contact with the knife, or, in other words, that the blade had been plunged into living blood.

Moreover it was stated by this witness that the blood could not have been that of an ox, pig or sheep, since the corpuscles were smaller than those of human blood, whereas the corpuscles of the blood upon the knife were of the same dimensions as those of human blood. The relative sizes of human corpuscles compared with those of the animals mentioned were stated to be as fifty-three to thirty-four in the case of the ox; as fifty-two to thirty-four in sheep's blood; and as forty-five to thirty-four in pig's blood.

The judge, in his summing up, made the following comments upon the evidence: "The witness had said that the blood upon the knife could not be the blood of an animal as stated by the prisoner, and took

upon himself to say it could not be the blood of a dead animal; that it was living blood and that it was human blood; and he had shown them the marvellous powers of the modern microscope. At the same time, admitting the great advantages of science, they were coming to great niceties indeed, when they speculated upon things almost beyond perception, and he would advise the jury not to convict on this scientific speculation alone."

The jury found the prisoner guilty upon evidence other than this "scientific speculation," the novelty of which probably prevented the judge from accepting it as a demonstration of facts which might be verified or disproved.

The application of a remarkable discovery in physiological chemistry has now made it possible to determine whether a blood-stain consists of the blood of any particular kind of animal.

In 1898 it was discovered by Bordet that on injecting serum of cow's milk into a small animal, such as a rabbit, which was then killed after a lapse of some weeks, the serum separated from its blood would produce a precipitate in cow's milk.

This discovery was supplemented by Wassermann, who, in 1900, found that it was possible in this way to distinguish between the milk of different kinds of animals, and he suggested the name *precipitines* for these specific precipitating agents formed in the sera of animals.

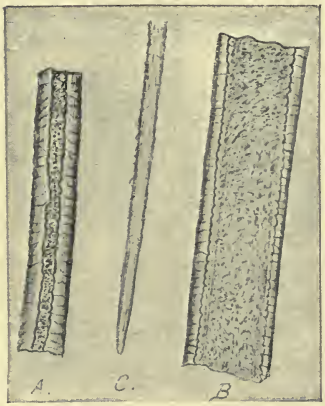
Then Dr. von Rigler showed that the method might be employed to distinguish between the flesh of different kinds of animals.

GOAT'S HAIR

A. Apex of Fibre.

B. Root.

C. Fibre showing central canal or medulla.



COW'S HAIR

A and B. Fibres showing central canal or medulla.

C. Apex of Fibre.

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He prepared a 20 per cent. aqueous extract from the flesh of seven different species of animals, and injected small proportions of these beneath the skin of rabbits at intervals of three days. After a month the animals were killed, and the serum of the blood separated in a centrifugal machine.

In each case the specific sera were added to the clear filtered aqueous extracts of the flesh of the respective animals, and the tubes examined after the lapse of a specified time.

It was found that the sera only gave a turbidity or precipitate with the corresponding extracts. Thus the serum from the rabbit which had been treated with an extract of horseflesh only gave a reaction with preparations of horseflesh, and not with those of venison, beef, mutton or pork. In like manner, the serum from a rabbit that had been treated with an extract of rabbit's flesh, only reacted with extracts of rabbit's flesh, and not with those prepared from the flesh of cats, horses, or other animals, and so on.

In the case of mixtures the specific sera only reacted with extracts of the flesh of the two animals in question. Thus a rabbit treated with an extract from a mixture of the flesh of a hare, cow, deer, and pig, yielded a serum giving a precipitate with the extracts of the flesh of each of those animals, but not with that from any other animal.

It was not long before the possibility of using the method to distinguish between the blood of different kinds of animals suggested itself, and it was shown by Dr. de Nobel in 1902, that by treating a mouse or rabbit with any fluid, such as blood serum or

saliva from a human body, it eventually produced a serum that would give a precipitate with human blood, but not with the blood of different species of animals.

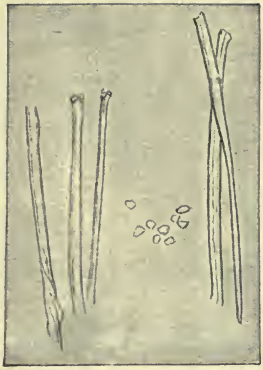
Reactions were also obtained with old human blood. Thus stains on linen from several days to two months in age, when treated with dilute solutions of common salt gave a solution which yielded a precipitate with the prepared rabbit's serum. No reaction was obtained, however, with the preparation from a blood-stain nine years old or with that from blood which had been dried in a high temperature.

It was also found that the specific sera could be evaporated in a vacuum without losing their activity, and that the dried residues could be preserved in sealed tubes in the dark, and mixed with water when required for use.

Other investigators showed that it was possible to separate the active agent by adding magnesium sulphate to the serum, and that the precipitate could be dried and kept for a long period. By dissolving it in water at any time a liquid with the specific properties of the original serum could then be obtained.

Later work has shown that this serum test is not quite so absolute as was at first believed. Thus, if the blood serum to be tested be used in too concentrated a form it may give a reaction with a serum that is not specific to it, though even in that case the precipitate will only appear slowly and its amount will be insignificant in comparison with that obtained when the two liquids correspond.

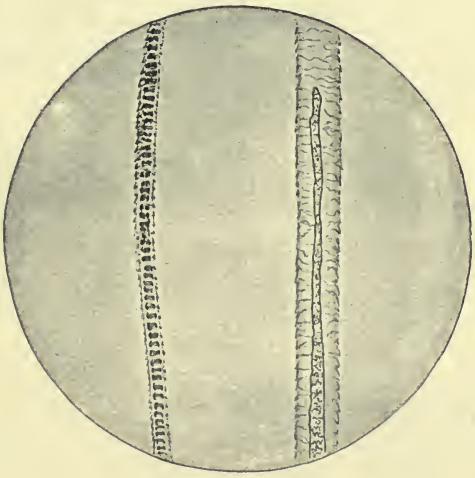
The error is obviated by using extremely dilute



FIBRES OF CHINESE SILKS,
SHOWING CROSS SECTION

KANGAROO'S
HAIR

HUMAN HAIR



A B

A. Hair of a Cat
B. Hair of a Dog

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solutions for the test, and when proper precautions are taken a solution of normal blood serum containing one part in 1,000 invariably gives a reliable reaction with its corresponding prepared serum. In more concentrated solutions there is an abundant deposit at the bottom of the tube within thirty minutes, whereas in the case of sera, which are not specific to the prepared serum, the formation of precipitate does not begin until the tube has stood for an hour or more.

An interesting exception to the rule is that the serum from the blood of anthropoid apes gives a pronounced reaction with serum that has been made specific for human blood, and *vice versa*.

As it is not possible to carry out control tests with an indefinite number of animals a positive result obtained in the examination of a particular stain justifies a report that the blood was (*e.g.*) probably human blood and certainly not that of any common domestic animal.

On the other hand, the results of a negative test justify a much more positive statement.

Thus on the first occasion in which evidence was given as to the results of this test, which was in a criminal case in France in 1902, the prisoner had asserted that certain incriminating stains had been caused by the blood of a rabbit.

A serum specific for rabbit's blood serum was therefore prepared, and the stains dissolved and tested as described above. No sign of precipitate was obtained within thirty minutes after applying the test and evidence was therefore given that the stain certainly did not consist of rabbits' blood. On the other hand,

a serum made specific for human blood gave an immediate precipitate with the solution of the stain, which, therefore, in all probability consisted of human blood.

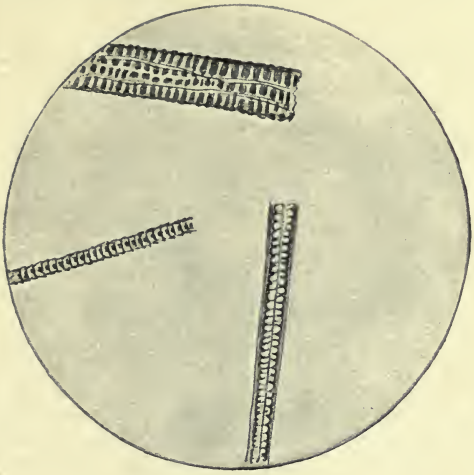
Although this method of testing blood-stains has been used on the Continent for several years, it is only within the past twelve months that it has been employed in a criminal case in this country.

Apparently the first occasion was in the recent trial of Mark Wilde for the murder of Mr. George Storrs, a mill-owner, at Gorse Hall. Evidence was given that old stains were present upon the outside of the sleeve of the prisoner's blue serge coat, although they were not visible to the naked eye. These were found to consist of mammalian blood, and the serum test for human blood gave a positive reaction. It was, of course, impossible to form any idea as to the age of the stains, and the witness, Dr. Wilcox, refused even to give an estimate upon this point.

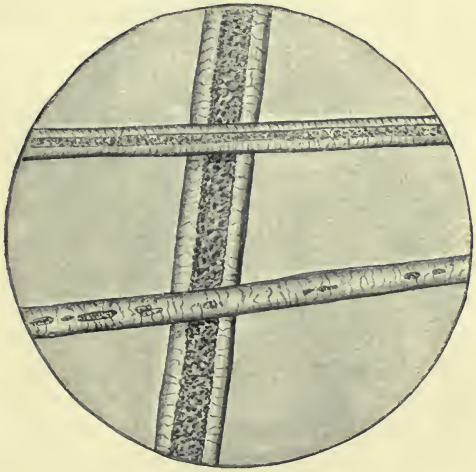
A simple method of applying the serum test has recently been discovered. A small quantity of human serum is placed into a series of tubes, and into each of these is next introduced one drop of the fresh blood of different animals diluted with salt solution, or of the dried blood dissolved in that liquid.

The tubes are now allowed to stand for thirty to forty-five minutes and are then examined. If in the case of the blood of unknown origin there is a faint red precipitate (of coagulated blood) leaving the upper liquid quite clear, the blood is of human origin.

On the other hand, the blood of other species of animals will have dissolved in the human serum, colouring it red.



RABBIT'S HAIR



HORSE HAIR

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If the tubes are charged in the first place with the blood of the horse, ox, or other animal, the corresponding blood is coagulated, while that of any other animal dissolves. In this way it is possible to apply the physiological test without the necessity of preparing a special serum by inoculation.

From time to time in criminal trials, the latest instance being in the Crippen case, the question occurs whether a given specimen of hair is of human origin or has been derived from an animal. Thanks to the pronounced difference in appearance shown by hairs of different origin when viewed under the microscope there is no difficulty in giving a positive answer to this question.

Human hair is characterised by being fairly uniform in diameter throughout most of its length and then tapering gradually to a fine point. The hair of an infant has very few scales upon its surface, and these stand out prominently, but in the case of an adult the scales are very numerous and appear closely pressed against the axis of the fibre. Another peculiar point of difference between the hair of a young child and that of a full-grown person is that in the case of the former there are some particulars in which the hair resembles that of certain animals. Thus it has a jointed appearance recalling to some extent the structure of the fibres of merino wool.

In the hair of many animals the medulla, or central canal, is plainly visible under the microscope, but such medullated fibres are apparently not formed in the case of human hair.

As the hair of many domestic animals might on superficial examination be mistaken for human hair, it is essential to take note of the characteristic differences, some of which are shown in the accompanying figures.

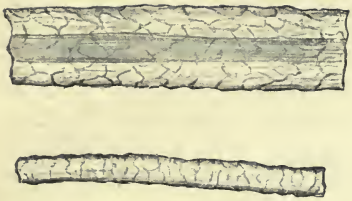
Three types of hair are found upon the cow, viz.: thick beard hairs, showing a medulla, soft woolly hairs, and fine beard hairs, both of which are without a medulla. In those fibres in which it is present the medulla is very pronounced and tapers towards the apex. The hair of the calf has the same structure as that of the cow.

Horse-hair is characterised by its lustrous cylindrical appearance. The commercial fibre is mainly derived from the mane and tail, and is much thicker and stiffer than the hairs from the body, which are those most likely to be met with in criminal investigations. As a rule, the latter are less than an inch in length, and the medullary canal is well marked.

In rabbit's hair the medulla is also very pronounced and is characterised by its structure of curious quadrilateral cells, which may either form a single row or increase to four or eight rows as the hair becomes wider. On the surface of the hair are numerous scales which fit into one another after the manner of the joints in a bamboo cane.

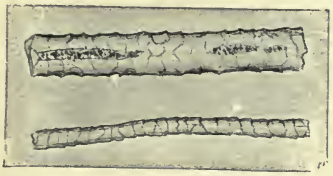
The chief commercial use of the rabbit's hair, which is usually about half an inch in length, is the manufacture of linings for hats.

The hair of the cat has a superficial resemblance to that of the thinner hairs of the rabbit. The medullary canal is very prominent, and occupies more than half



(IRISH WETHER)

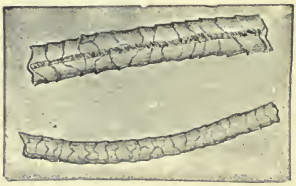
QUEENSLAND SHEEP



(NEW ZEALAND)

(LINCOLN WETHER)

(NORTH HOG)



(ARGENTINE CROSS BREED)

WOOL FIBRES

From different breeds of Sheep

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of the fibre. It is made up of a single series of quadrilateral cells, but unlike the cells in rabbit's hair, these may form additional layers in the thicker parts of the hair. The hair is generally a little over half an inch in length, and tapers to a fine point.

Dog's hair differs from the hair of the cat both in size and appearance. It is about three times as wide, while the medullary canal only occupies about one quarter of the diameter of the fibre. The surface of the hair is covered with characteristic scales, the edges of which project, so that the edge of the fibre has a saw-like appearance.

The accompanying plate shows hair taken from a Pekin spaniel and Persian kitten, and drawn to the same scale of magnification (104 diameters).

In the hair of the kangaroo the serrated edge of the fibres, due to projecting scales, is much more pronounced than in dog's hair. The medulla is well marked, but lacks the cellular structure to be seen in the hair of the cat and rabbit.

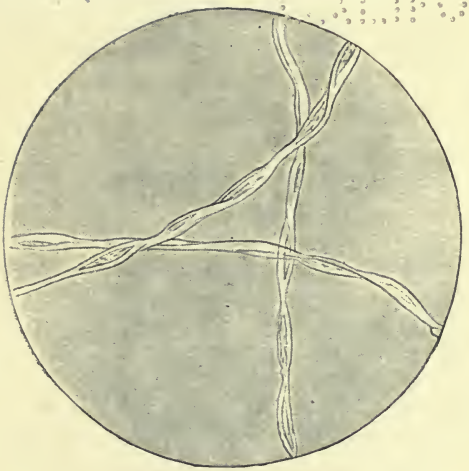
Goat's hair could not possibly be mistaken for human hair under the microscope. It has a root of characteristic appearance, and shows a well-marked medulla containing a structure of narrow cells.

Towards the middle the hair becomes very narrow, but expands again and reaches its greatest diameter a little before the point.

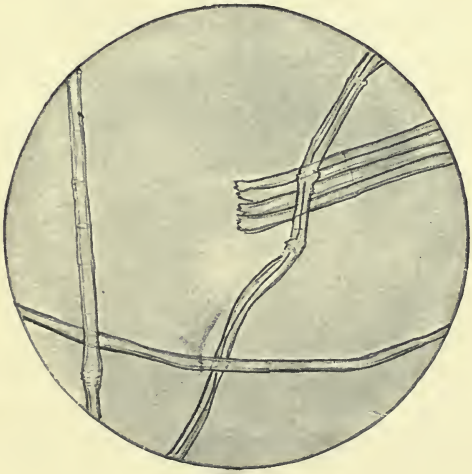
Sheep's wool is characterised by its surface structure of scales, the arrangement of which differs in the wool from different breeds of sheep. In some of the fibres the medullary canal is very manifest. Typical fibres of sheeps' wool are shown in the figures.

It is often necessary to distinguish between fabrics of cotton, linen, silk and wool, and in such cases the microscopical appearance of the fibres is invaluable as a preliminary test. Cotton is characterised by its curious corkscrew-like twists, and linen by its jointed structure, while silk has a long smooth cylindrical fibre, devoid of scales and showing little sign of structural formation.

In criminal cases neither cotton nor silk are likely to be claimed as human hair, although one may easily conceive the possibility of occasions arising where the composition of a peculiar material was a point of the utmost importance.



COTTON FIBRES



FLAX FIBRES

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CHAPTER XIII

EARLY POISONING TRIALS

MURDER of Sir T. Overbury—Mary Blandy—Katherine Nairn

MERELY to mention the word "poisoner" calls up a long succession of notorious crimes of the past, not to speak of the still more frequent cases where poisoning was suspected, though probably, often enough, with but little justification. Less than three centuries ago the fact that illness and death had come suddenly to any well-known person, was often sufficient to raise the whisper of suspicion; and any disease that did not yield to the favourite treatment of bleeding, and for which the physicians were for the moment unable even to find a name, was sure to be attributed by popular gossip to the action of poison or witchcraft, or of both.

The mysterious effect of certain substances upon the animal system and the fact that a knowledge of the nature of poisonous herbs was part of the lore of the old women who dealt in love-philtres, fully explains this association of poison with black magic.

In one of the earliest trials for poisoning of which we have any detailed account—that of Richard Weston in 1615—this belief in the miraculous power of the poisoner was present in the mind of the Lord Chief Justice (Coke) when in his charge to the grand jury he said that "The devil had taught divers to be cunning in poisoning so that they can poison in what distance of space they please by consuming the *calidum* or *humidum radicale* in one month, two, or

three or more as they list ; which they four manners of ways do execute (1) *gustu ;* (2) *haustu ;* (3) *odore ;* (4) *contactu.*"

Again, in the trial of Anne Turner, also for the murder of Sir Thomas Overbury (1615), evidence was given that she was in possession of parchments, some of which contained the names of the blessed Trinity ; others on which were written + B + C + D + E ; and another with a figure in which was inscribed the word " corpus," and to which was fastened a little piece of the skin of a man. " In some of these parchments were the names of devils who were conjured to torment the Lord Somerset and Sir A. Mainwaring if their loves should not continue—the one to the Countess and the other to Mrs. Turner."

Reading over the evidence of this trial one can hardly doubt but that this alleged sorcery had considerable weight in the conviction of Anne Turner ; for, as will be shown presently, there was no conclusive evidence of poison having been given at all.

The widespread hatred of witchcraft and the readiness with which any evidence of this description was accepted as a proof of poisoning, must have rendered it almost impossible for an unpopular character to be acquitted when accused of poisoning anyone.

The belief in witchcraft was very general in the seventeenth century, and medical men were even called in to give their expert opinion on behalf of the prosecution in the trials of those charged with being witches.

The most striking instance of this kind was at the trial of the Suffolk witches in 1665, before Sir Matthew

ANNE TURNER

Hale, Baron of Exchequer. It was alleged that the two women, Rose Cullender and Amy Duny, of Lowestoft, had bewitched a number of children with whose parents they had had disputes. The children, according to the evidence of various witnesses, had been afflicted in different ways, being sometimes blind, or deaf, or lame, and then suddenly recovering. And, in particular, it was stated that they would go into fits and after every fit would vomit crooked pins or twopenny nails with broad heads.

Mr. Sergeant Keeling, who was present, was not satisfied with this evidence and considered that it was not sufficient to convict the prisoners.

Dr. Browne, of Norwich (the Sir Thomas Browne whose fame rests upon his *Religio Medici*), was then asked to state what he thought of the evidence, and said that he was clearly of opinion that the persons were bewitched.

He said further " That in Denmark there had been lately a great discovery of witches, who used the very same way of afflicting persons by conveying pins into them, and crooked as these pins were, with needles and nails. And his opinion was that the devil in such cases did work upon the bodies of men and women, upon a natural foundation (that is) to stir up and excite such humours super-abounding in their bodies to a great excess, whereby he did in an extraordinary manner afflict them with such distempers as their bodies were most subject to, as particularly appeared in these children ; for he conceived that these swooning fits were natural, and nothing else, but only heightened to a great excess by the subtlety of the devil,

co-operating with the witches, at whose instance he doth these villainies."

This evidence is quoted at length, as showing the opinion of scientific men of that time upon the subject of witchcraft. It had great weight with the jury, and helped to make up for the lack of any real evidence against the poor women.

Further evidence was given "that at the least touch of one of these supposed witches, Rose Cullender by name, the children would shriek out, opening their hands, which accident would not happen by the touch of any other person."

A test was therefore applied in court, and a number of those present were directed by the judge "to attend one of the distempered persons in the further part of the hall, while she was in her fits, and then to send for one of the witches to try what would happen, which they did accordingly: and Amy Duny was conveyed from the bar and brought to the maid: they put an apron before her eyes, and then one other person touched her hand, which produced the same effect as the touch of the witch did in the court. Whereupon the gentlemen returned openly protesting that they did believe the whole transaction of this business was a mere imposture."

But even this test, which was plain proof of imposture, was distorted into evidence against the witches, and Mr. Pacy, the father of one of the children, declared "That possibly the maid might be deceived by a suspicion, that the witch touched her when she did not," and that she apprehended that the person who had done her this wrong was near.

Additional evidence was afterwards brought to prove other acts of witchcraft by the prisoners. The judge, in giving his direction to the jury, did not attempt to deal with the evidence "lest by so doing he should wrong the evidence on one side or other," but contented himself with pointing out that there were such creatures as witches, as was shown by the Scriptures and the laws made by all nations against such persons.

The jury retired, and after deliberating for about half an hour, found both prisoners guilty, and the judge sentenced them to be hanged. They were repeatedly urged to make a confession, but were executed without having done so.

Campbell writing of this trial says: "Hale's motives were most laudable; but he furnishes a memorable instance of the mischiefs originating from superstition. He was afraid of an acquittal or a pardon, lest countenance should be given to a disbelief in witchcraft, which he considered tantamount to a disbelief in Christianity. The following Sunday he wrote a 'Meditation concerning the mercy of God in preserving us from the malice and power of Evil Angels' in which he refers with complacency to the trial over which he had presided at Bury St. Edmunds."

Towards the end of the seventeenth century the belief in witchcraft became less general, and the last trial in this country took place in 1712 at the Hertford Assizes, when the prisoner was convicted but not executed. It was not until 1821, however, that the statute with regard to witchcraft was repealed in Ireland.

After the beginning of the eighteenth century there does not appear to have been any attempt made to prove the use of the powers of witchcraft in poisoning trials, and the evidence as to poisoning gradually became of a more convincing character than it was, for instance, in the series of trials of the murder of Sir Thomas Overbury in 1615 in the Tower of London, to which reference has already been made.

The prisoners in these trials included Anne Turner, Richard Weston, Franklyn, Sir Thomas Elwes (the Lieutenant of the Tower), and the Countess of Somerset.

It was alleged that the Countess of Somerset resented the interference of Sir Thomas Overbury, then a prisoner in the Tower, in her matrimonial schemes, or as Franklyn put it in his evidence : The Countess had told him that Sir Thomas Overbury " would pry so far into their affairs that it would overthrow them all."

Richard Weston, who had been an apothecary's man but had afterwards become under-keeper to the Lieutenant of the Tower, was arraigned on the charge that " he did obtain at the Tower of London certain poison of green and yellow colour called rosalgar (knowing the same to be deadly poison), and the same did feloniously and maliciously mingle and compound in a kind of broth which he did deliver to the said Sir T. Overbury with intent to kill and poison."

He was also accused of giving on other occasions poisons called " white arsenick " and mercury sublimate, which he " put and mingled " in tarts and jellies.

Weston refused to answer, and stood " mute on

God," until it was pointed out by the Lord Chief Justice (Coke) that refusing to speak was punishable by the rack, exposure and starvation, and would have the same consequence as a conviction by a verdict or by confession.

Anne Turner, who was tried as one of the accomplices, was the widow of a physician, and a friend of the Countess. She pleaded "Not guilty" to the charge.

The evidence as to sorcery used by her has already been mentioned, but the chief witness against her was James Franklyn, who made the following confession :—

"Mrs. Turner came to me from the Countess and wished me from her to get the strongest poison I could for Sir T. Overbury. Accordingly I bought seven, viz.: Aqua fortis, white arsenick, mercury, powder of diamonds, lapis costitus, great spiders, and cantharides. All these were given to Sir T. Overbury, and the Lieutenant knew of these poisons.

"Sir T. Overbury never eat white salt but there was white arsenick put into it. Once he desired pig, and Mrs. Turner put into it lapis costitus. At another time he had two partridges sent him from the Court, and water and onions being the sauce, Mrs. Turner put in cantharides instead of pepper, so that there was scarce anything that he did eat, but there was some poison mixed. For these poisons the Countess sent me reward. She afterwards wrote unto me to buy her more poisons."

It is obvious from this confession that the poisons supplied had no power, and it would seem that

Franklyn was making an income for himself by supplying harmless preparations for the poisons for which he was being paid.

As far as it is possible to judge by reading the evidence there was proof that attempts had been made to poison Sir Thomas Overbury, but no proof that any poison was ever given to him.

However, the evidence appears to have been quite sufficient to convict the prisoners. In passing sentence upon Anne Turner the Lord Chief Justice informed her that she had been guilty of the seven deadly sins, and that as she was the inventor of that horrid garb, the yellow tiffany ruffs and cuffs, he hoped she would be the last by whom they would be worn.

To this end he ordered that she should be hanged in that garb she had made so fashionable. This was duly done, while as a further condemnation of the fashion to which the judge had taken exception the hangman wore yellow bands and cuffs.

It is said that the fashion of wearing yellow starched linen died with her.

After the execution of Mrs. Turner and Weston came the trial of Franklyn, who confessed that poison had not been the cause of Overbury's death.

Weldon, who in 1755, published a history of the Kings of England describes how Franklyn and Weston "came into Overbury's chamber and found him in infinite torment with the contention between the state of nature and working of the poison, and it had been very like that nature had got the better in that contention . . . . . but they, fearing it might come to light by the judgment of physicians that foul play had

been offered him, consented to stifle him with bedclothes, which accordingly was performed. And so ended his miserable life, with the assurance of the conspirators that he died of poison, none thinking otherwise but these two murtherers."

The account given by Weldon of the manner in which the Lord Chief Justice received this confession is well worth quoting: "And now poor Mrs. Turner, Weston and Franklyn began the tragedy. Mrs. Turner's day of mourning being better than her life, for she died very penitently and showed much modesty in her last act. After that died Weston, and then was Franklyn arraigned, who confessed that Overbury was smothered to death not poisoned to death, though he had poison given him.

"Here was Coke glad to cast about to bring both ends together, Mrs. Turner and Weston being already hanged for killing Overbury by poison, but he being the very quintessence of the law presently informed the jury that if a man be done to death with pistol, poinard, sword, halter, poison, etc., so he be done to death, the indictment holds good, if but indicted for one of those ways; but the good lawyers of those times were not of that opinion, but did believe that Mrs. Turner was directly murthered by Lord Coke's law as Overbury was without any law."

After the trial and execution of the minor prisoners came the trial of the Countess of Somerset, the instigator of the crime, before the House of Peers.

The Clerk of the Crown asked her, "Frances Countess of Somerset, art thou guilty of the felony and murder, or not guilty?"

And she, making obeisance to the Lord High Steward, answered "Guilty," in a low timid voice.

The Attorney-General, Sir Francis Bacon, then praised King James in a fulsome manner, and held out hopes of pardon to the prisoner. The Lord Chief Justice Coke also talked in servile terms of the king, whose instructions for the investigation of the murder, he declared, "deserved to be written in a sunbeam."

The Clerk of the Crown now asked the Countess "if she had any cause to allege why sentence of death should not be passed upon her."

To this the prisoner replied in a low voice, which only the Attorney-General heard, "I can much aggravate, but cannot extenuate my fault. I desire mercy and that the lords will intercede for me to the king."

An officer of the Crown then presented the white staff to the Lord High Steward, and sentence of death was passed.

The Lord High Steward (Chancellor Ellesmere) now addressed the weeping prisoner in the following words: "Since the lords have heard with what humility and grief you have confessed the fact, I do not doubt they will signify so much to the king, and mediate for his grace towards you."

The next day the Earl was tried and was found guilty, but both he and the Countess received only nominal punishment. It was alleged that this leniency to the Earl and Countess was due to King James himself having been cognisant of the plot to kill Overbury.

The trial of Mary Blandy, in 1752, at the Oxford Assizes for the murder of her father is remarkable as being the first one of which there is any detailed record, in which convincing scientific proof of poisoning was given.

Mr. Blandy, who was an attorney at Henley-on-Thames, was extremely fond of Mary, his only daughter, and according to the story told by the prosecuting counsel at the trial, "had pretended that he could give her £10,000 for her marriage portion in hopes that neighbouring gentlemen would pay their addresses. But this pious fraud, which was intended for her promotion, proved his death and her destruction."

A Captain Cranstoun, who was recruiting at Henley, hearing she was to have £10,000 fell in love, not with her, but with her fortune, and concealed from her the fact that he already had a wife.

The father having heard rumours of the bad character of Cranstoun, refused to let his daughter have anything to do with him. She continued to see him, however, and listened to his proposal to get the father out of the way as soon as possible, so that he might get possession of the £10,000 of which the poor man had unfortunately said he was possessed.

In August, 1750, Mary Blandy began to prepare people for the death of her father by giving out that she had heard music in the house, this being looked upon as a certain portent of death.

Then Captain Cranstoun sent her a present of Scotch pebbles and enclosed with them a packet of a white powder which she was to put into her father's food.

She gave him some of this, which made him very ill, but as he recovered, Captain Cranstoun sent her more powder, and some of this she put into his gruel with the result that he again became violently ill, and died with symptoms suggestive of arsenical poisoning.

Before his death he was told that Mary had been putting poison into his food, and only said, "Poor love-sick girl. What won't a girl do for a man she loves? I forgive her: I always thought there was mischief in these cursed Scotch pebbles!"

The scientific evidence at this trial was given in a very convincing manner by a Dr. Addington, who had attended the poisoned man and had examined the body and tested the white powder that had been sent by Captain Cranstoun. He stated that this was arsenic, and that he had found the same poison in Mr. Blandy's gruel.

When asked in cross-examination why he believed this to be white arsenic he described the different tests he had applied to this powder and to a sample of pure white arsenic that he had purchased, and showed how the same results were obtained in each case, and concluded with the remark: "I never saw any two things in nature more alike than the decoction made with the powder found in Mr. Blandy's gruel and that made with white arsenic."

The judge in his summing up to the jury remarked that the case was one which was to be made out by circumstances. A great part of the evidence rested upon presumption, and if the jury regarded the presumption as a violent one, that is to say, one where the circumstances spoke so strongly that to

suppose the contrary would be absurd, that amounted in law to full proof.

The jury, after deliberating for five minutes, found the prisoner guilty. She was executed on April 6th, and left a written confession in which she stated that she had not been aware that the powder she had given to her father was in any way noxious or poisonous.

Cranstoun was subsequently prosecuted and outlawed for his share in the murder.

If the scientific evidence in this early trial was a model of what such evidence should be, the same can hardly be said of that given at the trial of Katharine Nairn and Patrick Ogilvie at the High Court of Edinburgh in August, 1765, for the murder of Thomas Ogilvie, the husband of Katharine. They had only been married in January of that year, and it was at about the same time that Patrick Ogilvie, who was a lieutenant in the army, had returned from abroad. Almost immediately he supplanted his brother in the affections of his wife, and, a quarrel taking place between the two men, Patrick was forbidden to come to the house. Shortly afterwards the husband died, having shown symptoms of irritant poisoning.

According to the story of the prosecution, Katharine told a woman named Clark, who lived in the house with them, that Patrick had undertaken to procure poison for her, and that she was going to give it to her husband.

An unsigned letter to Patrick Ogilvie, alleged to be in the writing of Katharine, with reference to the poison, was put in as evidence.

Testimony was also given by a surgeon of Brechin

that Lieutenant Ogilvie had obtained from him a small phial of laudanum which he said he required for his own health, and also half an ounce of powdered arsenic for the alleged purpose of killing some dogs that destroyed his game.

These he had sent to Katharine, who was believed to have put the arsenic in her husband's tea.

The defence was that the deceased had died a natural death, and that Katharine Nairn was in the habit of taking small doses of laudanum and of salts for her health. Expert evidence was given on her behalf by a Dr. J. Scott to the effect that "he had made experiments upon arsenic and knew well that it would not dissolve in warm water."

The evidence, which by the way is incorrect, went to prove that even if arsenic had been introduced into the tea it could not have caused death by poisoning.

A surgeon also gave evidence that the symptoms might have arisen from natural causes.

For the prosecution no proof of the powder being arsenic or that the husband had really died of arsenical poisoning was given, and no post-mortem examination was made.

The counsel for the defence put the position in the following form: "The incest is supposed to be certain because the husband is supposed to have been poisoned; and, on the other hand, the man is believed to have been poisoned, because there is supposed proof of incest."

Both prisoners were found guilty and sentenced to death, but the execution was delayed pending an appeal to the Privy Council in London. The sentences

were confirmed and Patrick Ogilvie was executed in November, but Mrs. Ogilvie, who was expecting the birth of a child, was kept in prison. A daughter was born early in 1766, and Katharine Nairn managed to escape from prison in March of that year.

The trial curiously foreshadowed the trial of Mrs. Maybrick a century later in many of its features, and, as in the modern case, convincing proof of guilt was wanting.

The question whether a particular substance is or is not a poison has frequently been raised in a court of justice, and on several occasions a prisoner has owed his acquittal to a conflict of scientific opinion upon the point.

This was the case in a trial that took place in 1836, at the Norwich Assizes, when two farm labourers were charged with having attempted to poison a fellow farm servant, by putting "a deadly poison," blue vitriol (copper sulphate), into a glass of milk. The man noticed that the milk had a metallic taste and only drank a portion of it; but this was sufficient to make him ill for a short time. On the milk being examined it was found to contain copper sulphate, and suspicion pointed to its having been doctored by the prisoners.

The counsel for the defence raised the objection that the accused were indicted for having administered a "deadly" poison, and that medical opinion did not hold that blue vitriol was a deadly poison.

A medical witness called on behalf of the prosecution stated that he considered that copper sulphate was a deadly poison, but at the same time admitted

that he had no experience of any case of poisoning in which that salt had been taken.

On the other hand, another doctor asserted that in his opinion the substance was not poisonous, and pointed out that it was not sold as a poison.

The judge, taking into account this conflict of opinion, decided that the matter was doubtful and the prisoners were acquitted.

In the Offences Against the Person Act of 1861 it is provided that any attempt to administer any poison or other destructive thing to any person whether bodily injury be effected or not is guilty of a felony.

As copper sulphate, when taken in quantity, will certainly cause bodily injury, the case tried in 1836 at Norwich, would now probably be decided differently, even though no bodily harm had actually been caused.

This is borne out by the trial of Cluderay, on the charge of attempted poisoning by administering pods of *coculus indicus*.

No harm had resulted to the intended victim owing to the fact that although the berries themselves are poisonous, the pod in which they are contained is insoluble when swallowed, and this prevents the berries from producing their toxic effects upon the system.

It was decided by the judge, however, that the giving of the entire pod was an administration of poison within the meaning of the Act.

It is not an easy matter to find a suitable definition for a poison. According to Taylor it is "a substance which, when taken into the mouth or stomach, or

when absorbed into the blood is capable of seriously affecting health or of destroying life by its action on the tissues with which it immediately, or after absorption, comes into contact."

As applied to criminal cases this definition is obviously open to criticism, for it is applicable to a substance such as coffee which, when taken in excess, will "seriously affect the health." Some reference to the quantity is therefore needed. A drug, such as morphia, may be of benefit when given in small doses, but becomes a poison when given in large quantity. In the case of Cluderay, however, it could hardly be contended that the administration of entire coculus pods, although not producing injurious results, could in any way be beneficial.

The trial of Tawell at the Aylesbury Assizes in 1845, on the charge of murdering Sarah Hart at Slough, presented several points of scientific interest.

The manner in which the electric telegraph was employed in effecting his capture has been described in another place.

At the trial Tawell denied that he had ever been to Slough at all, but the woman who had heard the screams of the victim had seen and spoken with him, and swore positively to his identity.

It was proved that on the day of the murder Tawell had bought some Scheele's prussic acid in London, but he accounted for this by the fact that he was constantly in the habit of buying the poison for external use.

In the cottage, where the woman was found lying dead when the doctor arrived, were two empty tumblers

and a bottle of porter, while a small amount of prussic acid was found in the stomach of the woman.

The counsel for the defence urged that there was no proof that the woman had died from the effects of prussic acid and that some sudden emotion might have been the cause of death.

As to the prussic acid found in the body, he suggested that it might have been derived from apple-pips eaten by the deceased.

Chemical evidence, however, was brought forward to prove that prussic acid could not have been formed as suggested in the process of digestion, and the only result of this novel defence was that for long afterwards the barrister was known as "Apple-pip Kelly."

In his summing up of the evidence the judge, Baron Parker, said with reference to one of the contentions of the prisoner's counsel: "If the evidence satisfies you that the death was occasioned by poison, and that poison was administered by the prisoner it is not necessary to give direct and positive proof of what is the quantity which would destroy life, nor is it necessary to prove that such quantity was found in the body of the deceased, if the other facts lead you to the conclusion that the death was occasioned by poison and that it was knowingly administered by the prisoner."

Referring to the argument that there was no proof that the deceased might not have died from the effect of a sudden emotion he pointed out that they were not to have recourse to mere conjecture; that where the result of the evidence gave them the existence of a cause to which the death might be rationally attributed

they were not to suppose without a reason for doing so, that it was to be attributed to any other cause.

As has already been mentioned, the evidence convinced the jury of the guilt of the prisoner, and he was sentenced to death.

CHAPTER XIV

NOTABLE POISONING TRIALS

Use of Poisons—Arsenic and Antimony—Chapman Case—Strychnine in Palmer Trial—Physiological Tests—Case of Freeman—Error from Quantitative Deductions—Poisonous Food Given to Animals—Mary Higgins—Negative Result of Physiological Tests—Hyoscyamus Poisons—Crippen Case—Experiment on Cats—Time Limit for Action of Arsenic—French Case.

The use of poisons but little known at the time has generally been due to a special knowledge of their properties on the part of the poisoner, who has hoped in this way to escape detection, and, in fact, has often done so.

Arsenic, which has always been a favourite with ignorant poisoners, is cumulative in its action, and remains in the system for a long time after it has been taken. It has a remarkable preservative effect upon the tissues, which it will keep for an indefinite length of time from decomposition. There is, therefore, little difficulty in detecting and identifying it in a body years after a crime has been committed.

The effect of antimony is very similar, and it was owing to this fact that it was possible in the Chapman poisoning case to prove that some of the victims had been poisoned with antimony.

Organic poisons such as prussic acid and vegetable alkaloids are much less stable in character, though

they are not so fugitive as some poisoners have supposed, and the presence of alkaloidal poisons in the system has been proved months after death.

In the celebrated Palmer case, to which reference has already been made, Palmer, who was a doctor, made use of strychnine, and, although he was convicted upon the medical and other evidence, Taylor, the official analyst, was unable to detect the poison in the remains. On these grounds and the evidence of other chemists who asserted that they could detect the slightest trace of strychnine, and that had that poison been given it must have passed into the system, the defence was set up that no strychnine had been given, and that the prisoner was entitled to an acquittal.

All that can be fairly deduced from the chemical evidence, however, is that no very large amount of strychnine was present, and that the method of separating alkaloids used by Taylor half a century ago was not capable of detecting traces of strychnine. So far, then, as regards chemical analysis, Palmer had succeeded in administering a poison in sufficient quantity to kill, but to escape detection.

With the more delicate methods of analysis now at the disposal of the chemist this would no longer be possible, for it has been repeatedly proved that it is possible to detect a minute trace of that alkaloid in the body many months after death.

The other details of this case are interesting as forming a very complete chain of evidence.

Palmer, as has been mentioned, was a medical man living at Rugeley, where he had formerly had a

practice. For some time prior to the trial he had given up medicine and devoted himself to horse-racing, with the result that he had lost heavily, and by the summer of 1855 owed about £20,000, which he had borrowed at an exorbitant rate of interest from different moneylenders.

As security for these amounts he had given promissory notes, in which he had forged the signature of his mother. It was his intention to have paid the most pressing of his creditors out of the proceeds of an insurance upon the life of his brother, who died in August of the same year.

The insurance company, however, from certain circumstances that had reached their ears, had a suspicion of fraud in connection with this policy, and refused to pay the sum insured.

The holders of the bills, therefore, prepared writs against Palmer and his mother, which were to be issued unless they received the promised money, and it was, therefore, a matter of urgency for Palmer to find a means of satisfying them.

Early in November he went to some races at Shrewsbury in company with a young man named Cook, and the latter won between £2,000 and £3,000, some £800 of which he received upon the race-course, leaving the balance to be paid in London.

To celebrate the occasion, Cook asked a number of his friends to dine with him at the hotel in Shrewsbury. That evening Palmer was observed holding a tumbler up to the light outside his bedroom, and he then went into the other room where Cook was talking to his friends.

After drinking some brandy, Cook became violently ill, and a doctor was sent for. Cook said he had been given something by Palmer, and gave his money into the charge of one of his friends, who next day returned it to him.

Notwithstanding his suspicions, Cook returned with Palmer to Rugeley, and put up at an inn there near Palmer's house. He was there visited several times by Palmer, who gave him coffee and broth, both of which made him violently sick. He was attended by a local medical man, who was very old, and, acting on Palmer's suggestion, this doctor prescribed morphine pills for the sick man.

Palmer went with the doctor to his surgery, helped him in the preparation of the pills, and undertook to see that the patient took them. Accordingly he went round to the inn the same night, and persuaded Cook, who was unwilling to have anything to do with them, to take the pills. Within fifteen minutes he had died, after showing all the symptoms of strychnine poisoning.

After Cook's death, his stepfather came to Rugeley, and made inquiries as to the cause of death. Certain circumstances drew suspicion upon Palmer, and this was strengthened when it was found that on several occasions he had bought strychnine, and that immediately after Cook's death he had been seen examining his pockets and searching under the pillow of the bed.

When asked whether there were not some sporting debts due to Cook, he denied that there were any, and it was significant that the betting book of the deceased man had disappeared.

It was further discovered that Palmer had since the death paid over considerable sums of money to his creditors, and that he had induced the old doctor who had been in attendance upon Cook to sign a certificate giving apoplexy as the cause of death.

A post-mortem examination was held, at which Palmer, although under suspicion, was allowed to be present. When the portion of the stomach was sealed up in a bottle, Palmer removed it to another part of the room while the attention of the doctors was otherwise occupied, and it was found that he had cut two slits in the parchment cover, and had attempted to get rid of the contents. Subsequently he offered a bribe of £10 to the driver who was to take the doctors to the station if he would upset the carriage and break the jar.

The evidence of the doctors called by the Crown left little doubt as to death having been caused by strychnine poison, and although a number of medical men gave evidence on behalf of Palmer, their opinions were conflicting and inconsistent, and, as the judge pointed out, were obviously aiming at an acquittal at all cost.

After a trial lasting twelve days, the judge (Lord Campbell) summed up the evidence, and dwelt in strong terms upon the scientific witnesses for the defence (see *ante*, p. 19). With reference to the fact that no strychnine had been detected in the body, he remarked that " there was no rule of law according to which the poison must be found in the body of the deceased, and all they knew respecting the poison not being found in the body was that in that part of

the body that was analysed by the witnesses no strychnia had been found."

Since physiological tests are, in many cases, much more sensitive than chemical tests, they have often been used for the identification of traces of poison isolated from a body. Thus a small quantity of a particular alkaloid will produce certain characteristic physiological results when injected into the circulatory system of a small animal, and should precisely the same results be obtained by the injection of the unknown substance, the obvious inference to be drawn is that the two substances are identical.

At the same time it has been shown on more than one occasion that it is not justifiable to draw a comparison between the quantitative action of a particular poison upon an animal and upon man.

As an instance of the danger of relying too exclusively upon the results of experiments upon an animal, the interesting case of Freeman, who was tried at Leicester in 1829, may be mentioned. A young woman, the servant of a chemist in the town, was found dead in bed. She had evidently died from the effects of prussic acid, and from the fact that the one ounce bottle from which the poison had been taken still contained three and a half drachms, it was inferred that she had taken four and a half drachms.

Owing to the facts that the arms of the dead woman were crossed upon her breast, and that the clothes had been pulled up neatly over them, while the bottle containing the remainder of the poison had

been re-corked and was lying by her side, it was thought that it was not a case of suicide, but that the poison must have been given to her.

Suspicion fell upon a young man named Freeman, who was an assistant of the chemist, and he was charged with having murdered the woman.

The point urged by the prosecution was that the action of prussic acid was so rapid, that it was impossible for the woman to have had the time to take the amount which had apparently been taken, and subsequently to have arranged the bed-clothes and corked the bottle.

Expert evidence upon this question was given by five doctors, four of whom gave as their opinion that these things could not have been done by the woman herself. In support of their view, one of them stated that the same quantity of prussic acid had killed a dog in three seconds.

Fortunately for the prisoner he was able to produce conclusive evidence of his innocence, and the jury, therefore, very rightly refused to accept the medical opinion.

Cases in which scientific evidence has been given to prove that a particular portion of food or drink is of a poisonous nature, as shown by its effects upon animals, have frequently been before the Courts, and the evidence is not so open to criticism as in Freeman's case, although, at best, such a proof is far less satisfactory than the separation and identification of the poison by chemical means.

In one trial, however, described by Taylor, which took place in the early part of last century in the

West of England, the evidence supplied by the accidental poisoning of some animals was so convincing as to prove the prisoner guilty, although chemical evidence of the presence of poisoning was wanting.

A farmer's wife was accused of having poisoned her husband by putting arsenic into his soup while they were dining together. Then, in order to get rid of all signs of her guilt, she had thrown the remainder of the soup into the farmyard, where the pigs and the fowls had devoured it. The husband had died with all the symptoms and appearances of arsenical poisoning, but no arsenic was found in the body by the imperfect methods of analysis then available.

All the animals in the farmyard had also died, apparently from the effects of an irritant poison, and in the bodies of some of them, probably owing to its quantity being greater, arsenic was found.

The evidence as to these facts, which was put forward at the trial, was regarded by the jury as conclusive proof that poison had been given to the man, notwithstanding the objections pressed by the defence that the poison had not been found in his body, and that, since none of the soup was left for examination, it had not been proved that the soup was poisonous.

With the more refined methods of analysis now available, such evidence would probably have been corroborated, seeing that the tests are capable of detecting arsenic even in the minute proportion of one part in sixty millions.

In a remarkable trial that took place, in 1831, at the Warwick Assizes, expert evidence that an animal had not been poisoned supplied the proof

required to establish the guilt of the prisoner. A woman named Mary Higgins was accused of having poisoned her uncle with arsenic. It was proved that he had died from an irritant poison, and there was also abundant proof that the niece had bought arsenic. Her explanation of this was that she had wanted it to destroy vermin, and by way of adding conviction to her story she actually produced a dead mouse, which, she alleged, had been killed by the poison. This proved a fatal blunder on her part, for an examination of the mouse showed that there was no arsenic whatever in its body. The defence was therefore discredited, and the prisoner was found guilty of murder.

The most valuable applications of physiological tests have been in cases where narcotic poisons have been used, and especially in the early days of chemical analyses, when the methods then known were incapable of identifying these poisons.

For example, in the year 1838 a woman was tried at Liverpool on a charge of having sent a poisoned pudding to another woman with the intention of poisoning her. The two children who were sent with the pudding tasted it on the way, and finding that it was bitter, mentioned the fact to the woman to whom they were taking it. She had other reasons for being suspicious, and, therefore, sent the pudding to a doctor to be examined. He applied various tests, but was unable to detect the presence of any poison, although from the taste he suspected that some narcotic poison was present.

Accordingly, he gave a small portion of the pudding

to a dog, with the result that the animal died within three hours with all the symptoms of poisoning produced by a narcotic poison. On the strength of this evidence, the prisoner was found guilty.

A French poisoning trial which took place in the early part of last century is especially interesting from the fact that it is apparently the only recorded instance, prior to the recent notorious Crippen case, in which the deadly plant, henbane, was the original source of the poison.

In the French case a child had been poisoned by some broth, and the symptoms had suggested the presence of a narcotic poison. The chemical analysis of alkaloidal poisons was at that time in its infancy, and in order to obtain proof of the poisonous character of the broth, some of the meat remaining in it was given to a cat. The animal died in about five hours, and the symptoms produced and the appearance of its body after death were all similar to those observed in the child.

The evidence was therefore regarded as corroborative proof that the plant henbane had been introduced into the broth.

In the present state of chemical analysis proof would have been expected of the presence of the active principles of henbane (hyoscine and hyoscyamine) in the broth and in the body of the victim, and physiological tests would probably only have been accepted as supplying additional proof of the identity of the poison.

A striking example of the way in which the scientific evidence may succeed in establishing the innocence of

a person accused of murder is seen in the following case, which was tried in 1835 :—A woman, who had a violent disposition and was subject to attacks of hysteria, accused her husband of having attempted to poison her, and in proof of her charge produced a white powder, which, as she alleged, he had put into her food. The powder was found to be white arsenic, and the food on examination was found to contain a fatal quantity of that poison. The husband was therefore immediately arrested and kept in prison pending the investigation.

The woman was perfectly well for eight days, but on the ninth day became very violent, and did many eccentric things, and on the next day she died. Examination of the body showed that arsenic had been the cause of death. Her husband denied that he had ever put any arsenic into her food, but had it not been for the scientific evidence he would probably have been unable to prove that he was innocent.

Undoubtedly he owed his escape to his having been in prison for the eight days between the accusation brought by his wife and her death, for the medical witnesses proved that it was not possible for him to have given the dose of arsenic which caused the death of the woman, since the effects of arsenic could not have remained latent in the system for that length of time.

Circumstances, therefore, indicated that the woman had committed suicide, and on the strength of this evidence the prisoner was immediately set at liberty.

To come to more recent times, the most notable

trial in which the results of experiments upon animals have formed one of the strongest links in the evidence against the prisoner, was that of George Henry Lamson, in 1881, who was convicted of poisoning his brother-in-law.

Here again the accused was a medical man, who was able by reason of his specialised knowledge to use a poison that at the time would not readily be identified in the body after death. In fact, in the opinion of Montagu Williams, who defended him at the trial, there could be but little doubt but that he had previously poisoned a brother of his victim in the same manner, without incurring any suspicion.

He was a young man twenty-nine years of age, in practice in a small way at Bournemouth. He was not well off and had been in pecuniary straits, and, as it was known at the trial, would have benefited materially by the death of his brother-in-law, Percy John, a lad of nineteen, who was at a school in Wimbledon.

Percy was a cripple, and had to be carried up and down-stairs, and to be wheeled about in a chair, but there was no reason why he should not have lived to old age.

The story told by the prosecution was that Dr. Lamson wrote to his brother-in-law, telling him he was coming to see him at the school on his way over to Paris, and the boy was disappointed on receiving a message that he could not come till the next day. On December 3rd, however, Lamson called at the school, and said that he had only time to pay a flying visit before catching the night train to Paris.

He produced some gelatine capsules, and also a cake. Taking one of these he remarked to the schoolmaster, who was present throughout the interview, that he would leave them with him, so that he might give nasty medicines to his pupils without difficulty. He then filled one of the capsules from a basin of sugar that was on the table, and turning to the boy, said: "Here, Percy, you're a swell pill-taker; take this, and show Mr. Bedbrook how easily it may be swallowed."

Dr. Lamson had also brought with him some sweets and a cake, and he gave slices of this to the schoolmaster and to his young brother-in-law, and also ate a piece himself.

Immediately after the lad had swallowed the capsule Lamson observed: "That's soon gone, my boy," and then remarked, "I must be going now."

He then left with the intention of catching the evening boat-train to Paris. Very shortly afterwards Percy became ill and told the schoolmaster that he felt exactly as he did four months before when his brother-in-law had given him a pill. Doctors were summoned, but in spite of everything that was done the poor boy died the same evening. A medical examination of the body showed no appearance of any disease that could have resulted in such sudden death, but a chemical examination of the stomach, which was made by Dr. Stevenson and Dr. Dupré, proved that a vegetable irritant poison must have been the cause of death.

Investigations showed that on several occasions

Dr. Lamson had purchased small quantities of aconitine from different chemists, and this strengthened the suspicions already attaching to him.

A few days later Lamson returned from Paris and voluntarily went to Scotland Yard, saying that as his name had been mentioned in connection with the case he had thought it best to call and see what was to be done about it. He was then arrested and formally charged with causing the death.

The trial was memorable for the conclusive nature of the scientific evidence. The cake and sweets had been analysed and found to be quite free from aconite and the gelatine capsules were also proved to be innocuous. At the bottom of the boy's box a pill-box had been discovered containing pills in which aconitine was present, but although the point was suggested by the defence, there was no evidence to show that the boy had secretly taken one of these.

The presence of morphia and aconitine in the body was proved, the latter being identified by its general chemical reactions as an alkaloid, by the burning sensation produced upon the tongue, and by its characteristic action upon mice, as compared with that of a standard solution of pure aconitine. In each case the animals died, the symptoms being the same and characteristic of aconitine poisoning.

For the defence it was urged by Montagu Williams that it was admitted by the scientific witnesses for the prosecution that they had no other proof of the identity of aconitine than these physiological tests upon mice; that their conclusions were a leap in the dark; and that mice had so delicate a constitution

that even an injection of pure water would kill them. How then could it fairly be argued that because these little animals had been killed by an injection of a substance extracted from the body, that substance must be aconitine ? Apart from that, bodies of the nature of alkaloids were formed in the body by decomposition, and the effects upon the mice attributed to aconitine might very well have been caused by one of these alkaloids.

It was further pointed out that there had been no opportunity of giving the boy a pill without the knowledge of the schoolmaster, and that the prisoner could not have charged the capsule with aconitine without having been observed.

The evidence put forward by the prosecution carried conviction to the jury, and the prisoner was found guilty and sentenced to death.

With reference to the more important points raised by the defence it may be mentioned that no known ptomaine (*i.e.*, alkaloid formed by decomposition in the body after death) produces the same physiological effects as aconitine, and that the conclusions of Dr. Stevenson and Dr. Dupré were based upon the results of comparative tests, which showed that as little as $\frac{1}{2000}$ grain of aconitine could be recognised in this way.

The probable solution of the mystery of how the prisoner managed to give the poison to the boy is suggested in the reminiscences of Lord Brampton, who, as Sir Henry Hawkins, was the presiding judge at the trial. He points out that Lamson was far too clever a man to attempt such a clumsy plan as to charge the capsule with aconitine, and thus draw

suspicion upon himself. The much more plausible theory is that the capsules had nothing whatever to do with the poisoning but that Lamson had previously put the aconitine into a raisin in the cake, and had taken care that his young brother-in-law should get the slice containing that raisin, while he and the schoolmaster had eaten other portions of the otherwise harmless cake.

After sentence of death had been passed, Lamson stood with his arms folded and in a loud voice proclaimed his innocence before God. Before his execution, however, it is stated that he confessed that he had not only poisoned Percy John, but also his other brother-in-law Herbert.

CHAPTER XV

THE MAYBRICK CASE

FEW trials in this country have aroused so much controversy as that of Mrs. Maybrick, in 1889, on the charge of having poisoned her husband with arsenic.

James Maybrick, who was a cotton merchant, fifty years of age, had married the accused in America in 1881, she being then eighteen years old. Four years later they had made their home in Liverpool, and apparently got on well together. In 1889, however, Mrs. Maybrick became friendly with a man named Brierley, and on the pretence of paying a visit to a relative, went to London, where she stayed with him for several days. At the end of March the Maybricks went to the Grand National Race, and the husband then became jealous of Brierley, who was also present. Following this incident came a violent quarrel, which resulted in Mrs. Maybrick's threatening to leave him.

Shortly afterwards, Mr. Maybrick paid a visit to his brother in London, and while there complained of the extravagance and the behaviour of his wife.

He also consulted a specialist, who diagnosed his illness as acute dyspepsia, and prescribed for him certain medicines, in which, however, there was no arsenic.

After his return to Liverpool early in April, Mrs. Maybrick bought a dozen fly-papers from a chemist, and afterwards two dozen more from another chemist,

stating that the flies were troublesome in the house. In each case she paid for these, although she had an account with the chemist. It was found that each of these papers contained from two to three grains of arsenic, or more than the fatal dose for a man. Evidence was given that they were subsequently discovered soaking in water in Mrs. Maybrick's room, but that they had not been used to kill the flies.

At the end of April Mr. Maybrick became very ill, and a doctor was called in. The patient was frequently given food and medicine by his wife, and arsenic was afterwards found in a bottle of meat juice. The prisoner alleged that at her husband's own request she had put a white powder into this bottle.

On the 9th of May the doctor concluded that Mr. Maybrick was suffering from the effects of some irritant poison, and Mrs. Maybrick from that time was not allowed to come near him. On May the 11th he died.

During the illness, letters between Mrs. Maybrick and Brierley had been intercepted, and in one of these occurred the expression that her husband was "sick unto death." At the inquest a verdict of "Wilful murder" against Mrs. Maybrick was returned, and she was committed for trial at the Liverpool Assizes.

The trial took place before Mr. Justice Stephen, who, by the way, died insane a year later, and the prisoner was defended by Sir Charles Russell, who subsequently became Lord Chief Justice.

The case for the prosecution was based upon the

presence of a strong motive for the crime, the quarrel between the husband and wife, the possession of arsenic (from the fly-papers) by the accused, the presence of arsenic in various foods and medicines alleged by witnesses to have been given to the deceased by his wife, and the discovery of arsenic in the body after death. In addition to this, evidence was given by the nurses that they had seen the prisoner manipulating the medicines, and by doctors and relations of Mr. Maybrick that he was not in the habit of taking arsenic.

For the defence it was urged that death was due to acute gastritis, which was the result of a chill or improper food, and that arsenical poisoning was not the cause; that the fly-papers had been purchased by the prisoner for the preparation of a cosmetic for the face; and that the presence of traces of arsenic in the body was fully accounted for by the fact that Mr. Maybrick was an arsenic eater.

Several medical men expressed opinions strongly opposed to the views of the prosecution, and it was pointed out by these that many of the symptoms characteristic of poisoning by arsenic had not been observed in this case. At the same time it was admitted that the effects produced by arsenic were often erratic, and, as Dr. Stevenson stated in his evidence for the prosecution, "There is no distinctive diagnostic symptom of arsenical poisoning. The diagnostic thing is finding the arsenic."

The medical experts who gave evidence upon behalf of the prisoner were Dr. Tidy (who, like Dr. Stevenson, was an official analyst to the Home Office),

Dr. Macnamara, and Professor Paul; and their view, which was strongly expressed, was that all the symptoms which had been described to them in the evidence pointed against arsenic having been the cause of death.

The judge, in his summing up of the medical evidence, pointed out that expert witnesses were liable at times to take up the position of advocates with regard to scientific matters, and he warned the jury to take this into consideration in forming their conclusions.

The analytical evidence as to the presence of arsenic in the body and in the food and medicine was given by Dr. Stevenson and by Mr. Davis.

Davis had found no arsenic in the stomach, but it was discovered in the liver and intestines. In the bottle of the meat juice he had found half a grain in solution. Arsenic was present in the glass of the bottle, but to a less extent than in the glass of another bottle of the meat juice, in the contents of which no arsenic was present. Hence the glass could not have been the source of the arsenic found in the other bottle.

He had also found arsenic in a glass of milk in the house, in a vessel in which luncheon had been sent to the office of Mr. Maybrick, in a medicine bottle, and in a bottle of glycerine in the lavatory. In fact, one of the most remarkable features of this case was the number of articles in which arsenic had been discovered. Dr. Stevenson had also found no arsenic in the stomach, but had detected a small quantity in the kidney and the intestines. In a portion of the

liver he found an amount which he calculated to amount to one-third of a grain for the whole liver, and he gave as his opinion that "the body at the time of death probably contained approximately a fatal dose of arsenic."

Dr. Tidy, in giving evidence on behalf of the accused, criticised this evidence of Stevenson on the grounds that it did not necessarily follow that because one portion of the liver contained so much arsenic, the same proportion must be present in the remainder. In his experience the amounts of arsenic retained might vary in different parts of the same organ. He calculated from the results of Stevenson's analyses that the total amount of arsenic was 0.082 grains.

If we examine this evidence more closely it is difficult to see upon what basis Tidy calculated his total. Stevenson had examined approximately one quarter of the liver, and had extracted from two portions a total quantity of 0·076 grains, so that, according to Tidy, the remaining three-quarters could only have contained 0·006 grains of arsenic. On the face of it this seems an absurd conclusion.

The evidence of Professor Paul went to prove that arsenic was present in the material of earthenware vessels similar to that in which the lunch was sent to Mr. Maybrick's office, and that it could be liberated by the action of an acid, so that the arsenic found in the particular vessel might have originated from the action of acids in the food itself upon the interior of the vessel.

As has been mentioned, one of the points brought

as evidence against the prisoner was that a bottle of glycerine had been found in the lavatory, and that this contained arsenic. There was no evidence that the prisoner had ever had this bottle in her hand, and, apart from that, arsenic is a very usual impurity in ordinary commercial glycerine.

Having regard to the conflict of the scientific testimony, and to the evidence of Mr. Maybrick having acquired the habit of taking arsenic while resident in America, it was generally expected that the prisoner would be acquitted. The judge, however, evidently believing her guilty, summed up strongly against her, and put the point to be decided in the following form: The prosecution said that arsenic was the producing cause of the gastro-enteritis which was the immediate cause of death; arsenic was found in the body, and strong proof was given that arsenic was administered. The terrible question was: By whose hand was it administered? The deceased might have taken it himself, and if there was any reasonable doubt upon that point it was the duty of the jury to acquit the prisoner; but if a crime was committed, no other person but the prisoner was suggested as having committed it.

The jury were so influenced by the remarks of the judge that, after a retirement of a little over thirty minutes, they found the prisoner "Guilty."

The feeling was very widely expressed that the prosecution had failed to establish beyond all reasonable doubt that the deceased had died from arsenic, and that arsenic had been given to him by the prisoner, and that, therefore, she was entitled to the

" benefit of the doubt," which the judge's directions to the jury had not allowed to her.

It may be mentioned here that the judge himself, in the second edition of his *Criminal Laws of England*, published in 1890, states that out of 979 cases tried before him up to September, 1889, " the case of Mrs. Maybrick was the only case in which there could be any doubt about the facts."

In consequence of this feeling that a terrible mistake might have been made, memorials for the respite of Mrs. Maybrick were signed by the physicians of Liverpool, by members of Bars of Liverpool and London, and by the citizens of Liverpool, in all of which stress was laid upon the conflict of medical testimony. Memorials were also sent in from other parts of the country, and in all 5,000 petitions, containing upwards of half a million signatures, were received by the Home Secretary.

The feeling was too strong to be ignored, and the Home Secretary, therefore, announced that he had advised the commutation of the death penalty to one of penal servitude for life, on the ground that: " Inasmuch as, although the evidence leads to the conclusion that the prisoner administered and attempted to administer arsenic to her husband with intent to murder him, yet it does not wholly exclude a reasonable doubt whether his death was in fact caused by the administration of arsenic."

Persistent efforts were made to obtain the liberation of the prisoner, and Lord Russell of Killowen, who had defended her at the trial, and whose belief in her innocence had never wavered, brought the

matter under the notice of each succeeding Home Secretary, but always without avail. It was not until after the lapse of fifteen years that she was liberated at the ordinary termination of a sentence shortened by the good behaviour of the prisoner.

The course followed by the Home Secretary (Matthews) and endorsed by his successors is impossible to defend from a logical point of view.

If the prisoner was guilty of murder, there was no justification for yielding to the popular demand. If, on the other hand, there was "a reasonable doubt" as to whether the man died from the effects of arsenic, she ought to have been set at liberty. But to commute the sentence for the reason given was to convict the prisoner of attempted murder, a charge upon which she had never been tried, and for which, if found guilty, she would not have received penal servitude for life.

At the present time a case of this kind would be brought before the Court of Criminal Appeal, and the prisoner would have the opportunity of having the alleged misdirections of the presiding judge investigated, and of putting forward additional evidence—advantages that were not available to the accused in this trial.

CHAPTER XVI

ADULTERATION OF FOOD

NATIONAL Loss from Adulteration—"Adulterated" Electricity—The Beer Conner—Conflict of Evidence—The Notice Dodge—Preservatives—Standards for Food—Court of Reference—Administration of the Law.

To label the adulterator of food as a criminal would, in the majority of cases, be too harsh a sentence, but in the worst forms of adulteration—those in which food that is positively bad is made to appear good—he more than deserves the title. Although in the larger proportion of instances the actual pecuniary loss inflicted upon the consumer by the sale of adulterated food may be but trifling, the loss suffered by the community collectively through various forms of petty frauds of this nature reaches an enormous total in a year.

Some idea of the extent to which the public is thus defrauded may be gathered from the instructive figures published some years ago by Professor Long in the *Nineteenth Century*.

In his article it was estimated that 1,400,000,000 gallons of milk were produced annually in the United Kingdom, of which over a third was sold in the form of milk, the remainder being converted into butter and cheese. Assuming that a tenth part of the milk were adulterated by the middleman, the loss to the farmer would represent over £600,000 per annum. There is little doubt but that this calculation underestimates

the amount of milk adulterated by the addition of water or by the separation of the cream.

The evidence given before a Select Committee of the House of Commons appointed to deal with the Food and Drugs Acts suggests that probably one-fifth of the butter imported into this country is adulterated, while it is almost impossible to form any estimate of the loss to the consumer from adulterated groceries and from the sale of foreign meat as " best English."

With few exceptions, nearly everything we eat or drink—in fact, nearly everything we buy—is liable to be substituted for what we want, or to be mixed with something else that we do not want—at all events, at the price we have to pay for it.

There is thus considerable excuse for the amusing blunder made by a counsel who was cross-examining Mr. Siemens, the electrical expert, in a case in which there was a dispute about the working of some electrical plant.

" I think, Mr. Siemens, that you have had a long experience in connection with electricity ? "

" That is so."

" Well, now, I want you to tell me whether in the course of all your experience you have ever known electricity to be adulterated ? "

" In only one instance," replied the witness.

" And when was that ? "

" In the phrase ' greased lightning,' " was the instant witty reply of the electrical expert.

But there are few commodities which can be bought or sold that have the clean record of electricity. In every direction, competition is daily becoming keener,

and rival firms " cut " the prices, each forcing the other to sell either with the minimum of profit or to stop selling altogether.

Under these conditions there is a strong temptation for a small firm in danger of being crushed out of existence by its competitors to avail itself of the additional profit afforded by adulteration, and thus be able to sell its goods at a lower price than its more scrupulous rivals.

In many cases the adulterated articles are sold unknowingly, the shopman being tempted by the offer of an alleged genuine product at a very low price, while the foreign manufacturer who supplies him with the goods cheerfully accepts the risk of prosecution, well knowing that he cannot be brought to book.

Frequently the adulteration is most skilfully effected, and every fresh advance in the chemical methods of detecting foreign ingredients is scientifically met by the adulterator. The old gross forms of adulteration are, for the most part, things of the past, save, of course, in the case of foods like milk, which contain much water, and where the temptation to increase the amount is frequently too strong to be resisted.

The old story of the grocer who called his apprentice to prayers after telling him to " water the treacle and sand the sugar," has lost its point, at all events as regards sanding the sugar. The fraud is too palpable. And the same may be said of other unskilful forms of adulteration, such as the addition of gypsum to flour, chalk to milk, starch to butter, and so on.

In short, adulteration of to-day has become a fine

art, and the public analyst has strong suspicions about many a sample, which he dare not condemn, since it might possibly be genuine, though of poor quality.

Long before the days of the public analyst there was an official who was, in a sense, his forerunner, and his methods were simplicity itself. As might be guessed, our ancestors three or four hundred years ago, were mainly concerned about the strength of the national beverage—beer, and they appointed officers who were known as "beer conners," to visit the different ale-houses, and to taste and examine the liquor that was being sold. According to Mr. Sidney Lee, John Shakespeare, the father of William, was appointed an ale-taster in 1557.

The test to be applied needed no complicated apparatus or chemical reagents—nothing beyond a pair of leather breeches, which were called the "conning breeches."

The beer conner would put these on, and having poured a little of the ale on to a wooden bench would sit down in it and patiently await the result. If after a given time he found that he was glued to the bench, the ale contained sugar, and was condemned as adulterated, but if he could rise without an effort the beer was passed as pure.

The oath to be taken by these beer tasters or conners ran as follows :—

> "You are the chosen ale-tasters of this town. You shall well and truly serve his Majesty and this town in the same office. You shall at all times try, taste, and assize the beer and ale to be put to

sale in this liberty, whether the same be wholesome for man's body, and present those that offend, or refuse to suffer you to assay it. You shall give your attendance at all courts, and present from time to time the offenders, and all things else belonging to your office you shall do and execute. So help you God."

A public analyst of to-day might well envy the easy lot of the beer conner, who had no difficult problems to solve, and who, if he condemned ale that had sufficient "body" to hold him to his seat, was sure of the support of the government officials.

To the layman it may seem strange that a conflict of opinion should ever occur between analysts with regard to the genuineness of a sample of food, and that it should ever be possible for an accused salesman to bring rebutting scientific evidence. A consideration of the following points, however, will make this clear, and show how such different opinions may be honestly held. (1) Food products may consist of entirely dissimilar substances, which may readily be distinguished by suitable tests, as, for instance, pepper and salt; or (2) the food may contain a special constituent which is either entirely wanting or only present in a smaller proportion in other allied products. It is mainly with foods of this latter description that the difficulties of the public analyst arise.

For instance, butter fat contains a large proportion of certain volatile compounds, which are either absent or are present in much smaller quantity in the fats used to adulterate butter; and thus an estimation of

these volatile compounds affords a means of judging of the purity of the butter. Thus, if only half the normal quantity of volatile compounds is present, the conclusion is drawn that the butter is adulterated with an equal quantity of foreign fat, and so on.

The task would not be difficult if butter fat were always constant in composition; but, unfortunately, there are often wide variations in the proportion of ingredients, and it frequently happens that the public analyst has to give his judgment upon a sample, which might either be a butter very rich in the characteristic volatile substances and adulterated with 10 per cent. of foreign fat; or it might be a genuine butter that was very deficient in these volatile compounds.

This, then, is the dilemma. If the analyst condemn such a sample on the strength of this and other tests, he may be confronted by the evidence of other analysts who will give their opinion that the butter is genuine; and if, then, the matter be referred to the Government analysts, their report may or may not corroborate his, and in the latter alternative the authority instituting the prosecution may have to pay heavy costs.

It is well known that butters are scientifically blended with foreign fats so as to fall just on the border line between abnormal and adulterated samples, and the analyst is frequently compelled to pass such a butter as genuine, lest he should unwittingly do an injustice.

A large proportion of Dutch butter is abnormal in this respect, and has been so frequently condemned

as adulterated by English chemists, that protests have been made by the leading Dutch analysts.

The reason for the abnormal character of Dutch butter appears to be that the cows are left too long in the fields, for as soon as they are stalled for the winter, the character of the butter gradually becomes normal again.

These details have been given at some length, for they are typical of the problem which the public analyst has to solve in the case of many natural products, *i.e.*, to decide whether a food is adulterated or only naturally of poor quality.

There is no special difficulty in the analyses ; it is a question of interpretation of the results.

The chief culprit in the matter of the adulteration of butter is the small dealer, who buys margarine from the margarine manufacturer and skilfully blends it with butter in a proportion that is small in a single instance, but is sufficient to bring him in a handsome profit in the course of a year.

Owing to the difficulty of detecting such small additions of margarine to butter (which, as was explained above, is due to the variations in the natural product) a most ingenious device has been adopted in some countries.

This is the addition of a small quantity of a " latent colour " to the margarine, so that, although it appears yellow, like butter, its colour can be changed by the application of a single reagent to pink or blue, and its presence thus revealed in a mixture of butter and margarine.

Several years ago an attempt was made in some of the

United States to compel manufacturers of margarine to colour it pink, so that it could not possibly be palmed off as butter, but as this law was found to have the effect of stopping the sale of margarine altogether, it is no longer enforced.

Various substances have been suggested as suitable for the latent colouring matter, such as starch, which turns blue on contact with iodine, and certain colourless coal-tar derivatives which change to pink upon the addition of an alkali or acid.

There are numerous objections to the use of some of these compounds. Thus, starch may be washed out of the margarine by a simple treatment with water, while a coal tar derivative that turns pink on contact with an alkali is too sensitive an ingredient for everyday use.

A far more satisfactory substance than any of these was found in the oil derived from sesame seed. This is a wholesome oil with a fragrant odour and pleasant taste, which is largely used as a salad oil in certain parts of Europe. It is one of the few vegetable oils that can be detected by means of a special colour reaction; for on treating the oil with a particular reagent it gives a bright rose colour, and the test is so sensitive that it will detect the presence of even a small percentage of sesame oil in other fats.

A compulsory addition of a small amount of sesame oil to all margarine, therefore, affords an absolutely certain means of recognising the margarine subsequently. The first country to adopt this plan was Germany, where a few years ago a regulation was made that all makers of margarine must use 10 per

cent. of sesame oil with the other ingredients. Belgium has also adopted the same plan of ear-marking the margarine produced in the country, and has thus simplified in one direction the problem of detecting petty adulteration.

A similar problem has to be solved in dealing with milk, the proportion of cream in which varies naturally to such an extent that it is possible to add a considerable amount of water to a rich milk without bringing it below the level of a poor but genuine milk. When such a sample of milk has been condemned, the analyst has often been confronted by an appeal to the cow herself.

But even the specious notice which was for years to be seen over a dairy: "Our customers may come and see the cows milked into their own jugs," is no proof that the fluid they yield is necessarily "milk."

For the up-to-date dairyman has discovered how to adulterate the milk at the other end of the cow. He has found that by giving her certain food in excess he can make her produce an abnormally large quantity of milk which lacks the right proportion of cream and other constituents of genuine milk. It has more than once been ruled by a bench of magistrates, and more recently in the High Court, that all is not milk that comes from the cow, and that a customer who asks for "milk" is entitled to get something with certain definite characteristics.

Even in cases where there would be no such escape from the results of the analyst's certificate, the ingenious adulterator is by no means at the end of

his tether, but has numerous dodges upon which to fall back.

One of the best known of these is the "notice dodge," examples of which must frequently have been seen by everyone.

A notice, often in very small type, is put up to the effect that the seller will not guarantee that the goods he sells are genuine. Then when he is summoned for selling, say, adulterated milk, he produces his notice and claims that that indemnifies him.

A very amusing instance of this notice dodge being carried to its logical conclusion was witnessed in Merionethshire a few years ago, when the Chief Constable of the district reported that all the shopkeepers had put up notices stating that "All goods sold here are adulterated."

A similar deadlock occurred, in 1903, in Buckinghamshire, and there the County Council forbade such notices being exhibited, though it is doubtful whether it was within its legal rights in so doing.

The plausible excuses put forward by the perverted ingenuity of the adulterator to escape conviction are innumerable. Mistake on the part of the seller, warranty with goods obtained from abroad, and the shop-boy as scapegoat are among the most common forms of defence.

The extent to which a legal quibble may be carried reached its limit perhaps in a prosecution that occurred a few years ago. In a certain village there was only one shop, and that was a co-operative store, of which the whole of the villagers were members. A county inspector bought "pure" coffee at this

shop, and on analysis the coffee was found to contain 90 per cent. of chicory, and eventually the manager of the store was fined.

For the defence, it was urged that the villagers were themselves both shopkeepers and purchasers, and, therefore, could not be prejudiced by the sale of adulterated goods. The inspector, however, was not a member of the co-operative store, and on this ground the prosecution was successful.

But if one of the villagers had bought the coffee, it is doubtful whether any fine could have legally been inflicted, for it would have been a case of co-operative adulteration.

A very common method of avoiding the attention of the inspector is a refusal to supply him with the goods. In a small town the dishonest tradesman will be on his guard against suspicious looking individuals, and should he consider them to be agents of the inspector will refuse to serve them.

A fine is imposed for refusal to sell, but this usually involves the shopkeeper in considerably less expense than a fine for selling adulterated goods, while he retains his character as an upright citizen.

The question of preservatives in food is typical of the present chaotic state of the law with regard to the adulteration of food.

A Parliamentary Commission sat for a long period, and finally issued a report, the recommendations of which were allowed to remain recommendations, and every analyst and public authority must still put its own interpretation upon what is and what is not permissible.

Preservatives are undoubtedly used in an absolutely haphazard way. Milk is preserved with all kinds of substances, chiefly boric acid, and at one time, formalin; butter and hams with boric acid; and jams with salicylic acid and similar compounds. Thus, at the end of the day, an unsuspecting individual may have consumed a considerable quantity of various antiseptic agents.

Everyone will agree that preservatives of every kind ought to be prohibited in milk, the more so since it is the staple food of young children and invalids, and in the case of butter the presence of a preservative should be notified, as recommended by the Commission.

A little boric acid in ham probably interferes much less with the digestion than an excess of salt, but it is right that the consumer should be given his choice of spoiling his own digestion in the way that pleases him best.

An objection brought against such notifications of preservatives in food is that they would convey no meaning to the public, but the commercial travellers of rival firms would certainly not lose the chance of making capital out of the notices of their opponents.

Nearly all the non-alcoholic wines and lime juice cordials in the market are heavily preserved. But the fact that the public demands an article that shall not ferment after the bottle has been opened, and that prosecutions for the use of preservatives are spasmodic, makes it impossible for the manufacturer to discard them. If he did so under the present conditions, he would no longer be able to compete with

other firms who continued to take the risk of prosecution.

Moreover, it is no uncommon thing for the defendants in these cases to call as witnesses on their behalf gentlemen holding positions as medical officers, and cases that are well defended are almost invariably dismissed.

The manufacturer of non-alcoholic wines stands in a very difficult position. If he employs preservatives in sufficient quantity effectively to stop fermentation he is liable to be prosecuted under the Food and Drugs Act. If, on the other hand, no preservative is used, the liquid is liable to ferment, and the manufacturer may then be prosecuted for selling a fermented liquid without a licence.

Hence it follows that if the use of preservatives in lime juice cordial and the like is to be prohibited, the law ought to be rigidly enforced and not applied in the present haphazard fashion, which allows one manufacturer to sell his goods unchallenged for years, and drags his competitor into one police court after another.

It is hardly fair that matters which are so much questions of opinion should be left to be fought out in the police courts before magistrates who have no technical knowledge to deal with them.

The position, however, was well put by a magistrate a year or two ago in giving his decision in a prosecution for the sale of lime juice cordial preserved with salicylic acid. Evidence was given by chemists and medical men for the prosecution that such an addition was injurious, while a number of

scientific witnesses of equal eminence were present to support the view of the defendants.

The magistrate, without calling upon the defence, dismissed the case. He held that there was an irreconcilable conflict of opinion between the purists who would allow no preservatives whatever in such products and the manufacturer who had to meet the popular demand for such an article that would keep after it had been opened, and he considered that it had not been proved that the amount of salicylic acid was in excess of that needed for that purpose. Incidentally he remarked that if notification of the addition of such preservatives on the label were made compulsory, "then the fun would begin." You would see notices of So-and-so's lime juice preserved with sulphide, "harmless, but with a smell of bad eggs." Or of So-and-so's lemon squash, "preserved with salicylic acid, refreshing, but ruinous to the digestion."

One of the recommendations of the Departmental Committee of 1899 was that means should be provided for the establishment of a separate Court of Reference, which should deal with the question of preservatives in food and decide which should be permissible and in what quantities they should be allowed.

Such a Court of Reference, in which there should be representatives not only of the medical and chemical professions, but also of the large manufacturers and dealers in food, would tend to remove the present state of uncertainty on this point.

Looking at the matter from a practical point of

view, it seems to be an impossibility to eliminate the use of preservatives from all articles of food, and it would be a far more satisfactory course if a *via media* could be found between prohibiting their use absolutely and leaving it to the manufacturer to dose his products with any quantity of any antiseptic. Evidence could be heard by such a body of official referees, who, after taking into consideration the views of all concerned, could from time to time issue authoritative regulations, which would be binding upon everyone.

It should also be part of the duties of such a Court to see that the regulations were rigidly enforced, so that a manufacturer who carried them out should not suffer by the competition of another manufacturer who (as at the present time) ran only a trifling risk of prosecution in ignoring them.

Another advantage of such a proposed Court of Reference would be that the manufacturer would no longer be liable to a criminal prosecution on points on which there is no agreement between the highest scientific authorities in the country.

Under the present conditions, a town or borough council, using the ratepayers' money, may attempt to get a decision on the subject of preservatives in an ordinary police court. The manufacturer, if he is rich enough to pay for the necessary expert evidence, will probably succeed in getting the case dismissed, as, in fact, has frequently been done.

But the magistrates' decision carries no finality, and is not binding upon anyone else, so that the borough council may raise the question again, and

prosecute the same firm for the same alleged offence in the same court. If, instead of selecting the same firm of manufacturers, which would have the appearance of vindictiveness, they bring an action against another firm which cannot afford the £200 to £300 required to win an action of the kind, and the case is tried before another magistrate, they may succeed in getting their victim heavily fined, and justice would thus be reduced to the absurdity that, while one magistrate held that there was no offence, his brother magistrate decided that a criminal offence had been committed. It may, perhaps, be mentioned that this is no imaginary picture, but is based on actual occurrences.

Another question which has been the subject of almost as many conflicts as the addition of preservatives is the colouring of preserved peas with a small trace of copper.

Many of the prosecutions have been successful, but quite as many have been dismissed. The public demands a green colour in the preserved peas it purchases, and it is apparently impossible to have this without the addition of copper.

Formerly a vigorous campaign was carried on in France to prevent any addition of copper whatsoever, but it was found to be impossible to enforce its absence, and the attempts to do so there have long been abandoned.

A better course than spasmodic prosecutions, frequently abortive, would be to fix a limit to the amount that might be used, and to render it obligatory upon the manufacturer to state prominently

upon the label that the peas were coloured with copper.

It may be mentioned in this connection that Professor Tunnicliffe issued a minority report to the main report of the Departmental Committee, in which he recommended that the amount of metallic copper to be allowed in preserved vegetables should not exceed half a grain per lb., and that its presence should always be declared.

The colouring of sugar by means of tin salts stands upon a very different footing, for in that case the colouring is done with the definite object of deceiving the purchaser.

At one time, pure Demerara cane sugar, which was brown from the presence of certain vegetable impurities, had a great reputation for its fine flavour, and still fetches a higher price in the market than purified beet sugar.

This reputation has been traded upon by certain unscrupulous sugar dealers, who have discovered how to treat white beet sugar with a tin salt or with aniline dye-stuffs so as to give it the appearance of the old genuine Demerara cane sugar.

At present it is practically impossible to distinguish, except by the flavour, between absolutely pure beet and cane sugars, but the dyed product is a very different substance from the brown Demerara sugar, and there have been numerous convictions for the fraudulent substitution of the one for the other.

The presence of traces of arsenic in food products is a very much more serious matter than the presence of a small amount of copper.

Arsenic is undoubtedly a cumulative poison, and the effects produced by the long-continued repetition of small doses were shown by the numerous fatal cases of poisoning caused by drinking arsenical beer, in the poisoning epidemic a few years ago.

It may be safely asserted that for twenty years before that outbreak it had never occurred to anyone to test beer for arsenic. The possibility of its being present ought to have suggested itself, but apparently it never did.

The origin of the arsenic in the beer is obvious, when it is remembered that glucose is one of the substances commonly used in the brewing of beer, and that glucose is prepared by treating starch with sulphuric acid, which, is in turn, frequently made from iron pyrites containing arsenic.

After the source of the arsenic in the Manchester beer had been discovered, an arsenic " scare " set in. Every possible description of food was examined, and traces of arsenic were found in many hitherto unsuspected places.

Malt, dried in kilns and allowed to come in contact with the fumes from coal, invariably contains an appreciable amount of arsenic derived from the coal, and even malts prepared with the greatest care usually contain about one part per million of arsenic. For all practical purposes, however, so small a trace is negligible.

The members of the Royal Commission which was appointed to examine and report on arsenic in food were strongly divided with regard to whether any trace of arsenic should be permitted in food. Some

were in favour of absolute prohibition, while others recognised that, even if this were done, the rule could never be rigidly enforced. Hence their report bears evidence of a compromise, for it states that although the Commission had been unable to discover that such minute traces of arsenic were injurious, yet they were unwilling to admit that any quantity, however small, was permissible in food.

Subsequently they recommended that a particular test should be used which would ensure that arsenic in food and drugs should not exceed an infinitesimal trace, and that frequent tests of raw and finished materials should be made.

These recommendations are now widely adopted, and it is highly improbable that another epidemic of arsenic poisoning will ever occur again in this country.

No better illustration of the vicious circles in which adulteration may move can be found than in the practice of certain manufacturers of jam of the cheaper kind. Apple pulp is a common constituent of jams which conceal their identity under another name. Now, in the case of raspberry jam, for example, it is necessary to have the seeds as well as fruit pulp, and these seeds may be bought very cheaply from the makers of fruit essences.

The best quality of these essences is prepared by mixing the fruit with alcohol and distilling the mixture, the spirit carrying over with it the ethereal oils to which the fruit owes its characteristic odour and flavour. Cheaper fruit essences are imitated chemically by making the most important of the

compounds in the genuine ethereal oils, and dissolving them in spirit ; but they are usually coarse in flavour, and do not bear comparison with the real product. Where intermediate grades are wanted, mixtures of the real and synthetical essences are often blended, and these frequently imitate the natural product so closely as to be only distinguishable by a trained sense of smell and taste.

In the preparation of the genuine fruit essences a residual pulp, containing the seeds and woody fibre of the fruit, but devoid of all flavour or aroma, is left behind, and it is this which the unscrupulous jam manufacturer makes use of in preparing a cheap jam, in which the seeds, at all events, are genuine. Then, in order to give more flavour to his product, he buys from the essence maker a flavouring essence, a small part of which may have originally been derived from the fruit that has given him the pulp and seeds for his jam.

The question of adopting a fixed standard for all natural products is one that has been widely discussed. It would have the advantage of simplifying the issue to be decided by the analyst and of preventing possible errors of judgment in the case of samples upon the border line between undoubtedly genuine and undoubtedly adulterated products. On the other hand, the legal fixing of a standard gives security to a skilful adulterator, who is able to make his goods fall within the limit of the figures given by genuine products of low quality.

Although most of the milk in large towns consists of the mixed products of many herds of cows, and

thus tends to have a percentage of fat only slightly higher than that required by the law, there is but little doubt that a considerable proportion is scientifically watered and thus brought down to a limit of richness, which is only a little above that which will enable it to pose as milk straight from the cow.

Another instance of this effect of standardisation was seen in Bavaria, where a few years ago a minimum analytical figure was fixed for lard, with the result that the American lard merchants sent to Germany large quantities of lard which answered the requirements of this test, but were heavily adulterated with beef fat.

However much an analyst may deprecate the fixing of standards for such products as milk and butter, he is forced in practice to fix a standard for himself. The Society of Public Analysts, recognising this, passed a resolution that milk to be regarded as genuine must contain not less than 11½ per cent. of solid matter, and of this not less than 3 per cent. must be fat.

This fixes the standard for milk at a very low limit, and undoubtedly leaves a margin for the watering of rich milks.

On the other hand, Dr. Vieth, whose experience in the examination of milks was probably unequalled, wrote in reference to this standard: "I think it is very judiciously fixed, but in upholding the standard of purity, it should never be forgotten that the cows have never been asked for nor have given their assent to it, and that they will at times produce milk below standard. A bad season for haymaking is, in my

experience, almost invariably followed by a particularly low depression in the quality of the milk towards the end of the winter. Should the winter be of unusual severity and length, the depression will be still more marked. Long spells of cold and wet, as well as of heat and drought, during the time when cows are kept on pasture, also unfavourably influence the quality and, I may add, the quantity of milk."

Mr. H. D. Richmond, who had also had the opportunity of examining an immense number of samples of milk, considered that the standard of 3 per cent. of fat was a reasonable one for the mixed milk of a whole herd, but considered that milk ought not to be pronounced as watered unless the solids other than fat were well below 8·0 per cent., except upon evidence derived from other tests.

In the Sale of Food and Drugs Act of 1899 powers were conferred upon the Board of Agriculture to make regulations determining what deficiency in the proportion of constituents of milk, cream, butter, or cheese should raise a presumption that the product was not genuine until the contrary was proved. Acting under this section of the Act, the Board adopted the minimum limit of the Society of Public Analysts, so that now any milk containing less than 3 per cent. of fat and 8·5 per cent. of cream is regarded as adulterated unless it can be proved by the vendor that it is genuine, and it thus has the effect of transferring the burden of proof from the prosecution to the defence.

As was mentioned above, the whole tendency of

recent legal decisions is towards enforcing this standard. For instance, in a case in which there had been "an appeal to the cow," it was held by the present Lord Chief Justice that: "If, however, the article produced, although it is produced by the cow, is the result of an abnormal condition of things arising either from disease, or, as here, from unsound treatment of the cow, I think that does amount to evidence upon which the magistrates can find the article is not of the nature, substance, and quality of the article demanded."

A want of system characterises the whole administration of the Food and Drugs Act, and many of the local authorities are unwilling to see that an adequate number of samples are taken.

For instance, only a few years ago, Lancashire, with a population of over a million and a half, was content with 1,755 samples, or one to each 10,000 people, while in Essex, with a population of over half a million, the samples taken were 686.

In Bury St. Edmunds no samples at all were taken during the four years ending 1899, and a similar lax administration of the law in many other places might be cited.

Some places pride themselves upon their freedom from adulteration, because out of the paltry number of samples taken by the inspectors, a quarter of the number or less may have been adulterated.

Even when the limited number of samples is properly taken, there is often a scandalous inadequacy and frequent inequalities in the amount of fine inflicted.

For instance, a milkman was fined one shilling at

Margate for the sale of watered milk—a fine grossly inadequate to take away temptation ; while in other courts we find fines of a pound or more imposed for exactly the same offence.

The remedy for this would be to have a fixed scale of fines for each offence. Another direction in which legislation is needed is the protection of the middle-class buyer. At the present time a shopman runs little or no risk in selling adulterated food to private houses. And the greater the vigilance of the local authority in protecting the buyer over the counter, the greater is the temptation to the shopkeeper to make an illicit profit out of ordered goods. Some means might well be provided for the examination of purchases in transit.

As a rule, the public is apathetic in the matter of adulteration, and errors of judgment, frequently inevitable under the present system, on the part of the analyst have led to his being regarded as the natural enemy of the tradesman.

If some system of standardisation for food products were generally adopted, leaving the burden of proof of the genuineness of abnormal samples upon the seller, and if the element of chance in the administration of the law were reduced, this prejudice on the part of tradesmen in general would disappear, although with the dishonest dealer the public analyst would become more unpopular than in the past.

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THE END

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